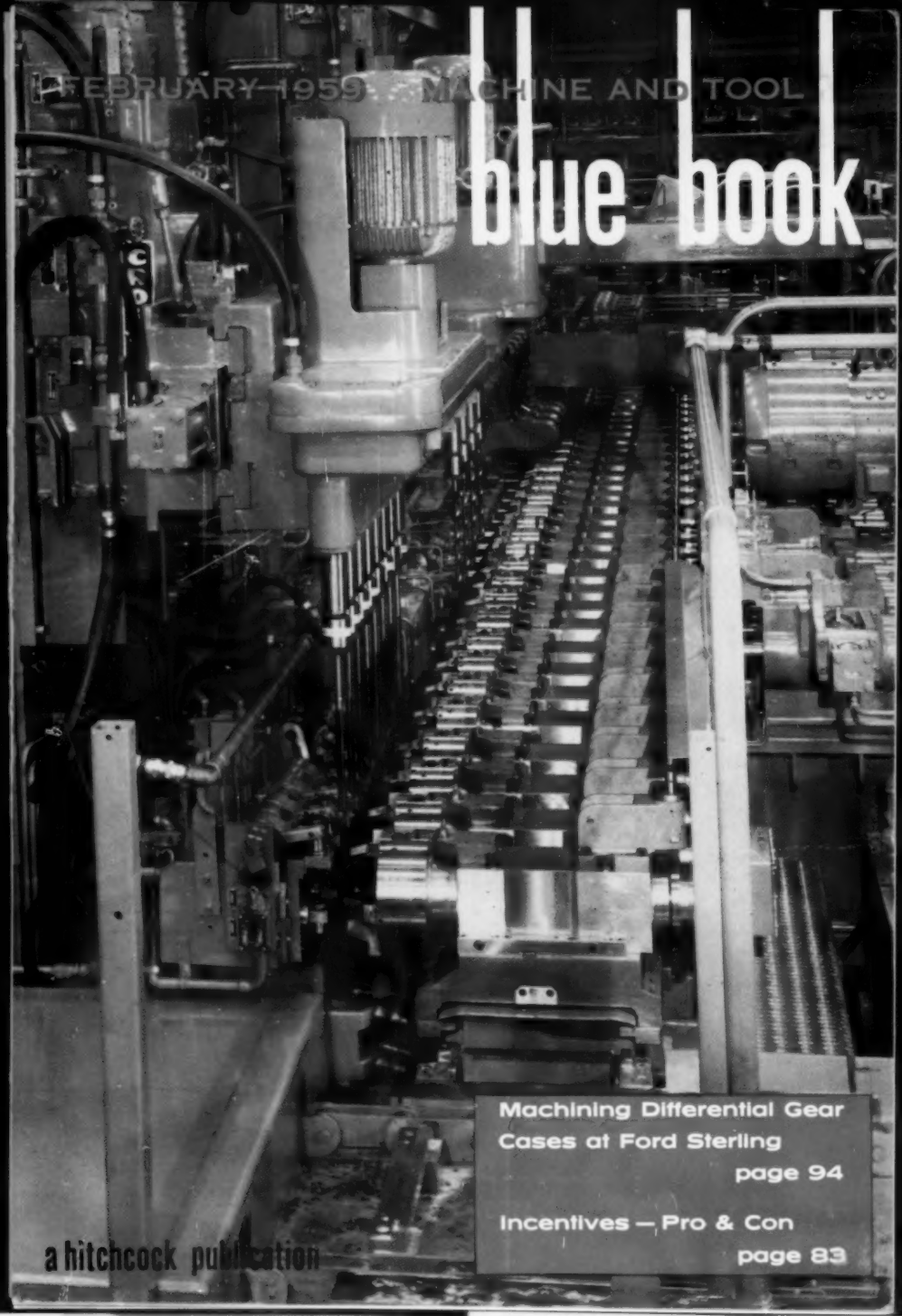
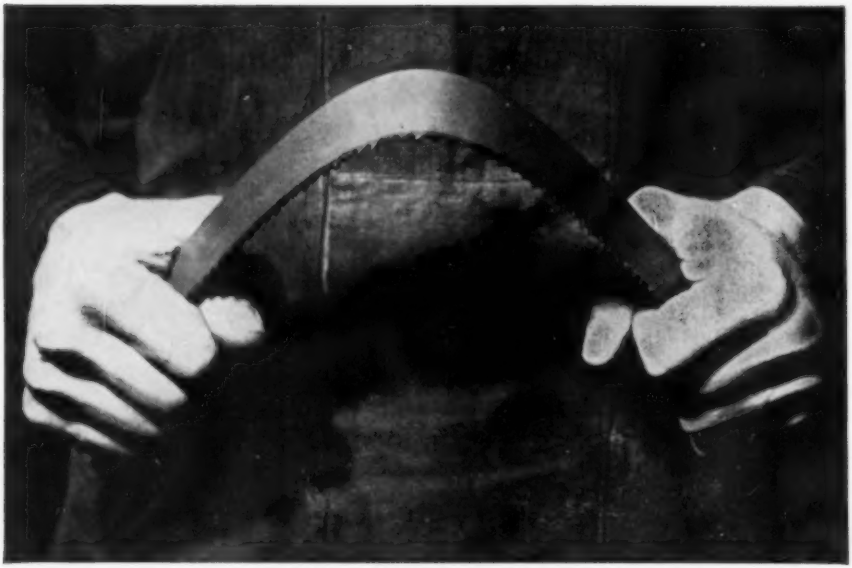

FEBRUARY 1959 MACHINE AND TOOL
blue book
Machining Differential Gear Cases at Ford Sterling
page 94
Incentives — Pro & Con
page 83
a hitchcock publication



THIS is No Ordinary Power Hack Saw Blade

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade —the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge.

With a MARVEL Blade, you can cut any material—from the free machining steels to the toughest alloys . . . fast, accurately and economically. You can tension a MARVEL Blade from 200% to 300% tauter than any ordinary blade, permitting much higher speeds and heavier feeds without deflection or breakage.

Like all good things, attempted copies of the MARVEL Blade have been numerous, but its performance has been *unequalled* by any of the imitators. Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

Write for latest cutting tool Bulletin and the name of your nearest MARVEL *Distributor.*

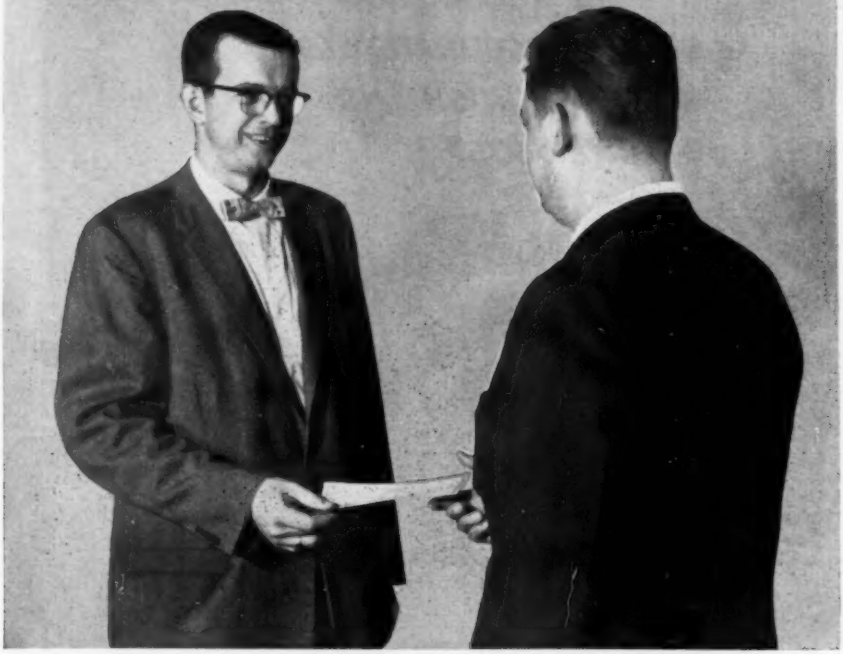
MARVEL *Metal Cutting* SAWS

Better Machines · Better Blades

FB-1039

ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.

ZAGAR OFFERS A $100 REWARD FOR THAT TOUGH DRILLING JOB



We'll send you our check in the amount of $100 for every lead that materializes into an order for a drilling machine with these specifications:

1. Using 50 or more spindles at one pass.
2. Holes must be ½" diameter or larger.
3. Steel or other tough materials.

A hint to help locate such a job:

Plants and shops which use a large number of single-spindle drilling machines are logical prospects, because one Zagar multi-spindle drilling machine can drill up to 1500 holes at one pass.

Describe your job clearly for our Engineering Department to judge. PLEASE mention this magazine.

ZAGAR INC., 23900 Lakeland Blvd. • Cleveland 23, Ohio

Use postpaid card. Circle No. 201

94 ELECTRIC CLUTCH HAND TURRET LATHE

- *MORE PRODUCTION*
- *MORE ACCURATE WORK*
- *FINER FINISH AND*
- *LOWER COST*

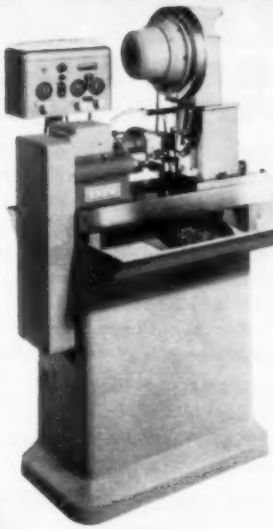
FREE
descriptive catalog

THE WADE TOOL CO.

51 RIVER STREET
WALTHAM 51 MASS.

Use postpaid card. Circle No. 202

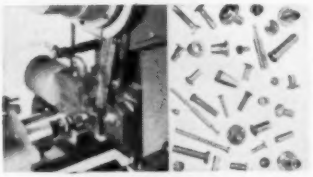
NOW AVAILABLE...



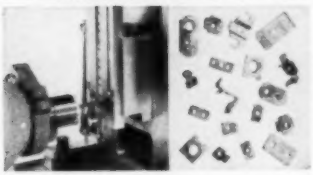
for automatic drilling, tapping or threading

Hand feed or hopper feed with or without air-operated clamp

NOW...drill rivets faster with minimum tooling costs



Drills 500-3600 per hour; hopper feed; air-operated clamping. Capacity #74 (.0225") to ⅛" in mild steel.



Taps 4000 per hour hand feed magazine. Capacity #0 to ⅜" fine pitch in mild steel.

A new horizontal version of the same operating principles long used in Snow vertical machines. Snow machines reduce changeover time, and cut tooling costs to a ridiculous minimum. On your next job, let us show you what the Snow method can do. Submit samples and prints.

Snow Manufacturing Company, Dept. B, 435 Eastern Avenue, Bellwood, Illinois (Suburb of Chicago)

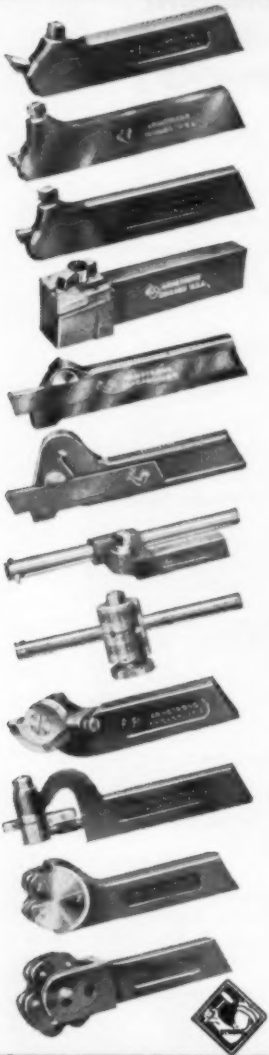
SNOW *master fixtures save dollars and days in tooling costs*

Use postpaid card. Circle No. 203

ARMSTRONG

TOOL HOLDERS

A Correct Tool for Every Lathe Operation



You can save time (and money) by ensuring that your machine tools are equipped with *adequate numbers* of the correct ARMSTRONG Tool Holders. The ARMSTRONG System of Tool Holders includes correctly designed tools for *every* standard operation on lathes, shapers, and planers, and for many operations on turret lathes and screw machines. By utilizing the ARMSTRONG System of Tool Holders, you can reduce tooling costs, eliminate down time in tooling up, operate your machine tools at maximum feeds and speeds.

ARMSTRONG Tool Holders are long-lasting tools. They are strong beyond need, handy and efficient, profitable to use, and are readily available from your local ARMSTRONG Distributor.

Check over your ARMSTRONG Tool Holder needs.
Write for literature.

If you do not know the name of your local ARMSTRONG Distributor, inquire when asking for literature.

ARMSTRONG BROS. TOOL CO. 5208 W. ARMSTRONG AVE. CHICAGO 46, ILL.

Use postpaid card. Circle No. 204

Reader's Guide

MACHINE AND TOOL blue book

FEBRUARY, 1959 VOL. 54 - No. 2

Accepted as Controlled Circulation Publication at Pontiac, Illinois

BPA

SEE NEXT PAGE

Reader's Guide

continued

Shop Hints

Field Reports

Departments

Editorial Staff

W. F. SCHLEICHER, vice-president and editorial director; P. A. MELINE, managing editor; DARRELL WARD, field editor; D. M. CARLSON, assistant editor; NANCY JACKSON, editorial assistant; JOYCE RICHARDT and LOIS NEWMAN, Reader's Service; R. S. SIETSEMA, Research Director.

Editorial Advisory Board

M. JOHN AHLSTROMER, asst. factory manager, Chicago Screw Co.; RONNIE BURRITT, factory manager, J. J. Tourek Mfg. Co.; R. T. CARLSON, supt. NRK Mfg. & Eng. Co.; ED FLUSKEY, Consulting Eng., Revere Camera Co.; HOMER F. GRIFFITH, asst. works mgr., Construction Equipment Div., International Harvester Co.; JOE KOSINSKI, works mgr., Scully-Jones & Co.; PAUL PRIKOS, vice pres., Prikos & Becker Tool Co.

Business Staff

R. C. VAN KAMPEN, president; VINCENT C. HOGREN, executive vice president; J. E. HITCHCOCK, HENRY J. SMITH, DAN E. REARDON, vice-presidents; JOHN S. TODD, production manager; M. L. YONTS, secretary and advertising production manager; OLIVER S. PEPPER, business mgr.; BRUCE B. HOWAT, Director of Marketing; L. M. SCHROEDER, art director; R. L. SPRECKELS, circulation manager.

Hitchcock District Managers are listed on Page 64.

Subscription rates: $5.00 per year in U.S.A. $6.00 per year elsewhere

SAVE

On Base Price! On Set-up Time! On Maintenance!

Typical parts produced by 2½" Model AW Cleveland, at profitable production rates, with simple tooling. Ask your CLEVELAND representative to submit a cost analysis with production estimates on your work.

REMEMBER,
Clevelands Cut Costs!

with the low-cost CLEVELAND 2½" model AW single spindle automatic

With a base price of $4000 to $5000 *less* than other comparable automatics, this Model AW Cleveland will set an unbeatable production pace in your shop. Not only is it fast, precise and highly versatile, it is a rugged, *fool-proof* automatic, free from complicated mechanisms and controls that require constant adjustment and maintenance.

Quick and easy to set up, this Cleveland features universal camming — rapid, hand crank stock feed adjustment—quick change collet pads—four automatic spindle speeds for each set of pick-off gears. An easily accessible tooling area is provided by wide, independent double cross slides and large diameter 5-hole turret. Forty spindle speeds —69 to 1920 rpm—give you efficient speeds for all types of materials and tools. Forward and return turret tool feeds are infinitely variable through a simplified mechanical drive.

With the 2½" Model AW Cleveland, you can *cut your costs three ways:*—ON BASE PRICE—ON SET-UP TIME—ON MAINTENANCE. For detailed machine specifications, write for AW Bulletin.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

4930 Beech Street
Cincinnati 12, Ohio

SALES OFFICES: CHICAGO
CLEVELAND • DETROIT
HARTFORD • S. ORANGE

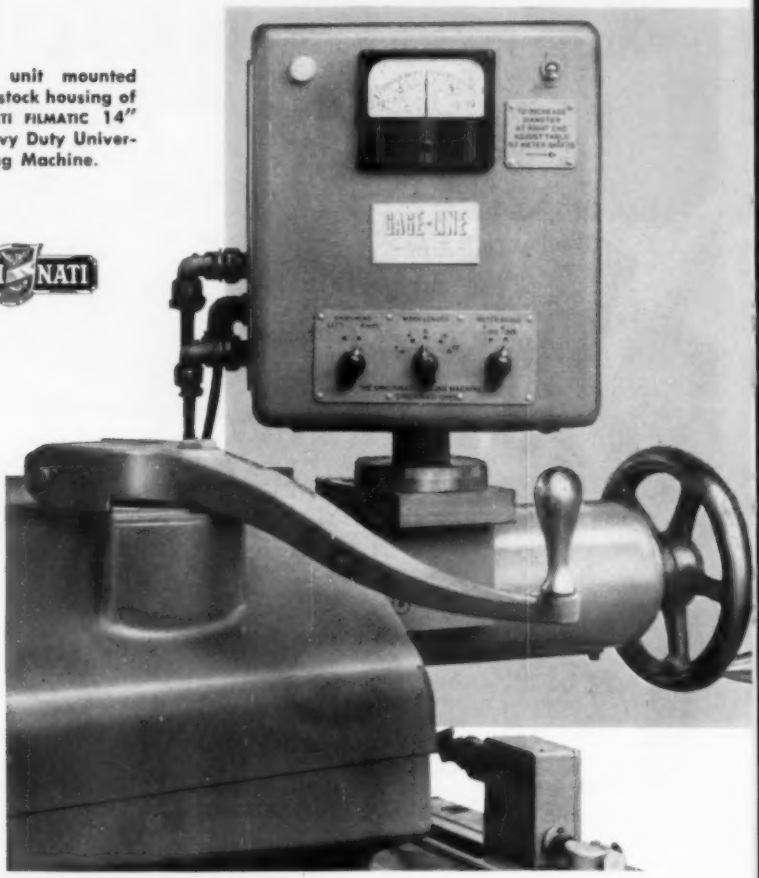
Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

Use postpaid card. Circle No. 205

CINCINNAT

gives you positive correctio

Gage-Line unit mounted on the footstock housing of a CINCINNATI FILMATIC 14" x 36" Heavy Duty Universal Grinding Machine.



CINCINNATI®

CENTERTYPE GRINDING MACHINES • CENTERLESS
MICRO-CENTRIC GRINDING MACHINES • CHUCKING

GAGE-LINE UNIT

of taper ... quickly; accurately

Taper is an elusive factor in centertype grinding. The cut and try method of eliminating or correcting it is expensive and quite often wasteful of nearly-finished parts. Gage-Line is Cincinnati's answer to precise taper control. It is an electronic taper correcting unit which eliminates trial and error with amazing sureness and accuracy. ¶Here's the way it works. A gage head is mounted on each end of the table, and an electronic control unit is mounted on the right-hand end of the machine. When the swivel table is adjusted, the control unit electronically translates the signal from each gage head to a graduated meter, reading direct for amount of movement and length of workpiece. ¶Gage-Line unit is another forward step by Cincinnati in their continuing efforts to improve the accuracy and reduce the cost of precision centertype grinding. Gage-Line is available for all CINCINNATI FILMATIC 4" to 14"L Plain Grinding Machines and 10" to 18" Universal Grinding Machines having between-center lengths up to 48" inclusive. Want more information? Ask for brochure G-687.

FILMATIC

Gage-Line unit mounted on the bed of a CINCINNATI FILMATIC 18" x 48" Universal Grinding Machine. Detailed information on these fine precision grinders in catalog No. G-663-2.

GRINDING MACHINES • ROLL GRINDING MACHINES
GRINDERS • CENTERLESS LAPPING MACHINES

GRINDING MACHINE DIVISION
The Cincinnati Milling Machine Co.
Cincinnati 9, Ohio

Use postpaid card. Circle No. 206

. . . you can get your bearings from a Bunting distributor!

IMMEDIATELY AVAILABLE today from local Distributors all over America are many hundreds of sizes of bearings and bars made of the newest bearing metals that science has developed to cut cost, improve performance, and extend the life of moving mechanisms.

...ask or write for your copy of

Catalog No. 58 Listing—
866 stock sizes of Bunting Cast Bronze Bearings.
667 stock sizes of Bunting Sintered oil-filled Bronze Bearings.
267 stock sizes of Bunting Cast Bronze Tubular and Solid 13" Bars.
84 stock sizes of Bunting Sintered oil-filled Bronze 6½" Bars.

Catalog No. 258 Listing—
343 sizes of Electric Motor Bearings for all makes and sizes of electric motors.

machine shop service . . . Emergency machine shop service is maintained in all Bunting Branches.

your Bunting distributor . . . Your Bunting distributor is listed in the classified section of your telephone directory.

made to blueprint . . . Unmatched engineering, manufacturing and research facilities for special bearings and parts of Cast Bronze and Powdered Sintered Metals.

The Bunting Brass and Bronze Company
Toledo 1, Ohio
EVergreen 2-3451

Bunting

BUSHINGS • BEARINGS • BARS AND SPECIAL PARTS OF CAST BRONZE OR SINTERED METALS

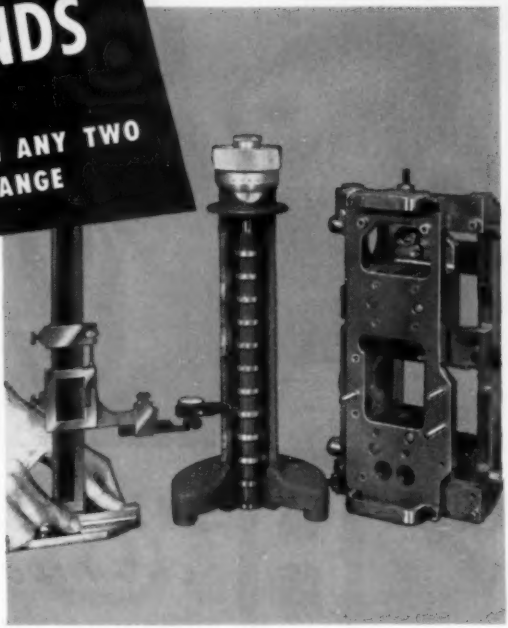
Use postpaid card. Circle No. 207

SETTING TIME:

10 SECONDS

ACCURACY:

.00005" BETWEEN ANY TWO POINTS IN 12" RANGE



Cadillac PLA-CHEK

SPEEDS ACCURATE INSPECTION from *MINUTES* to *SECONDS*

Designed for easy portability and extreme ruggedness, this 12" Cadillac PLA-CHEK takes little more than 10 seconds to set! Permits surface plate checking and inspections nearly 5 times faster than by ordinary methods.

And, accuracy is assured! Between any 2 points in the 12" range accuracy is guaranteed within .00005".

With a reverse checking plate, a height-gage indicator is easily set for checking the underside of parts. Use of inside micrometers, telescoping and internal cylinder gages gives this gage added versatility.

Wire, write or telephone TODAY for complete details.

NEW 18" and 48" Models Round Out PLA-CHEK Line

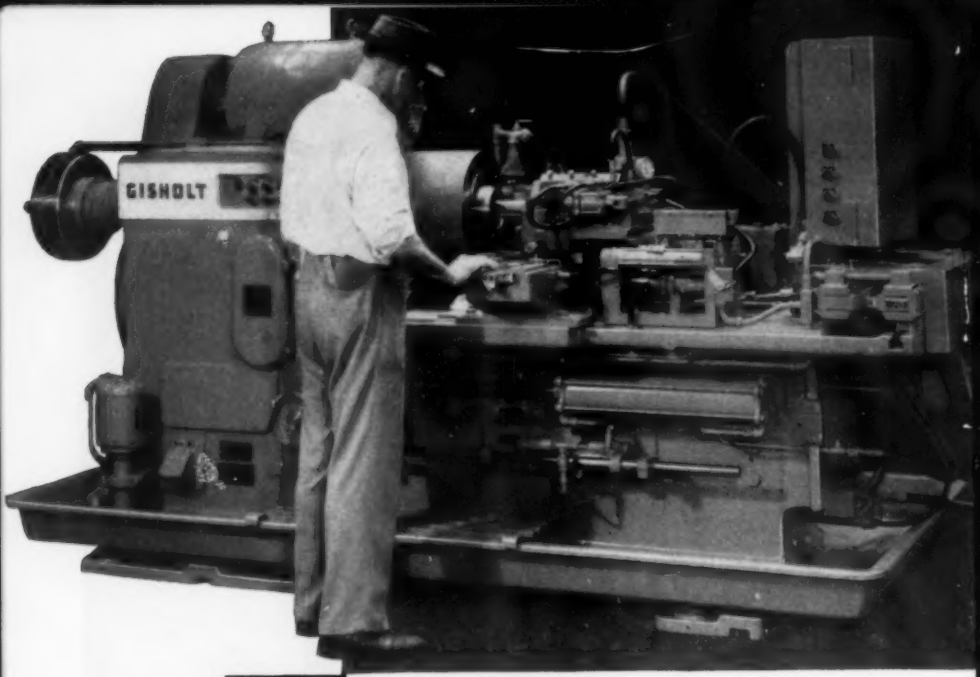
With the addition of two new models—the 18" and the 48"—Cadillac PLA-CHEK Gages are now available in a complete range of sizes from the easily portable 6" model to the new 48" model. Intermediate models include the 12", the 18", the 24" and the 36".

The PLA-CHEK spacer bar is an integral and solid unit. This eliminates any possibility, over a period of time, of humidity separating or changing the 1" steps. This provides a unit that maintains its extreme accuracy.

Cadillac GAGE COMPANY

P. O. BOX 3806 • DETROIT 5, MICHIGAN

Use postpaid card. Circle No. 208



HOW 8 SIMPLIMATICS

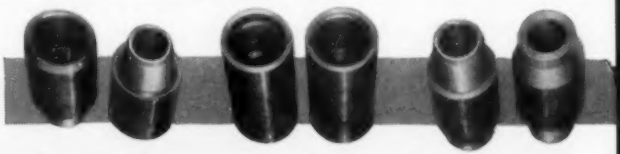
cut machine time 50%
cut man hours 75%

The way you can slash costs with the Gisholt Simplimatic often surprises some of the most experienced production men.

Here's a big shop which found that 8 Simplimatics could take over the job done on 16 other machines. And it takes only 4 operators instead of 16 to turn out the volume of parts required.

Not the least in the cost picture is the machine itself. For the basic Simplimatic design permits you to individualize the machine to a high degree to solve many different problems. Thus, for many jobs you can have all the advantages of a special machine merely with special tooling. Yet it's all done on a Standard Simplimatic—at far lower cost.

The importance of lower costs these days makes it important for you to get all the facts about Simplimatic Automatic Lathes.



In producing these tool joint pins and boxes, the 8 Simplimatics work in pairs with fully automatic operation: one man can easily tend two machines.

Ask about the many different arrangements possible on the Standard Simplimatics with platen table, vertical head, etc.

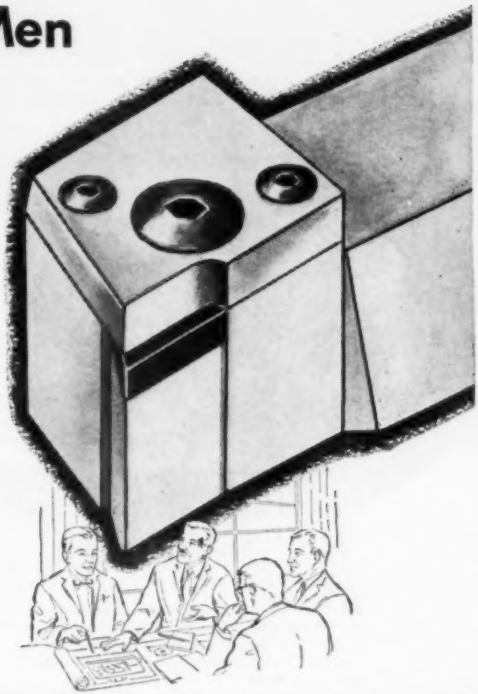
MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY, *Madison 10, Wisconsin*

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY-REBUILT MACHINES WITH NEW MACHINE GUARANTEE

Use postpaid card. Circle No. 209

Production Men ENGINEER the Carbide in the Tools . . . for Best on-the-job Results



PRODUCTION MEN KNOW cutting problems. That's why all V-R Carbides are engineered by production men to handle thousands of production applications. This fund of cutting know-how goes to work for you whenever you use V-R Carbides and cutting tools.

HERE'S THE POINT. You wouldn't specify 1020 steel for a job requiring a nickel-chrome 3140. Similarly, the proper Carbide grade is determined by the specific cutting problem. V-R engineers will be glad to work with you to fit the right Carbide to your job.

COMPLETE LINE OF CARBIDE, CERAMIC AND TANTUNG® CAST ALLOY CUTTING TOOLS.

Send for new Catalog VR-58 for complete details

V-R Vascoloy-Ramet corporation

PRIME MANUFACTURERS OF REFRACTORY METALS ENGINEERED FOR THE JOB

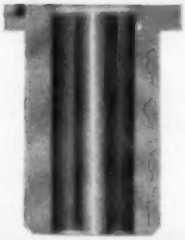
C-7045

834 Market Street • Waukegan, Illinois

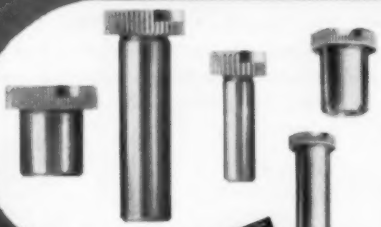
Use postpaid card. Circle No. 210

you get close tolerance drilling with
UNIVERSAL DRILL BUSHINGS

Accurately machined bushings are essential when drilling to close tolerance. UNIVERSAL DRILL BUSHINGS, of finest quality steel, are carefully tested for 100% concentricity and hardness, assuring pin-point accuracy and uniform quality. To prevent tool hang-up and breakage, each bushing has a blended radius on the top inside diameter.



All bores are superfinished. This superfinishing of bushings is important, especially in close tolerance work, because it reduces both tool and bushing wear to a minimum. Knurled head gives a quick, sure grip.



We stock drill bushings in all standard sizes and lengths at each of the following offices—Universal Engineering Sales Co., 1060 Broad St., Newark 2, New Jersey; 5035 Sixth Ave., Kenosha, Wis., and at our home office in Frankenmuth. Contact the nearest office for immediate delivery.

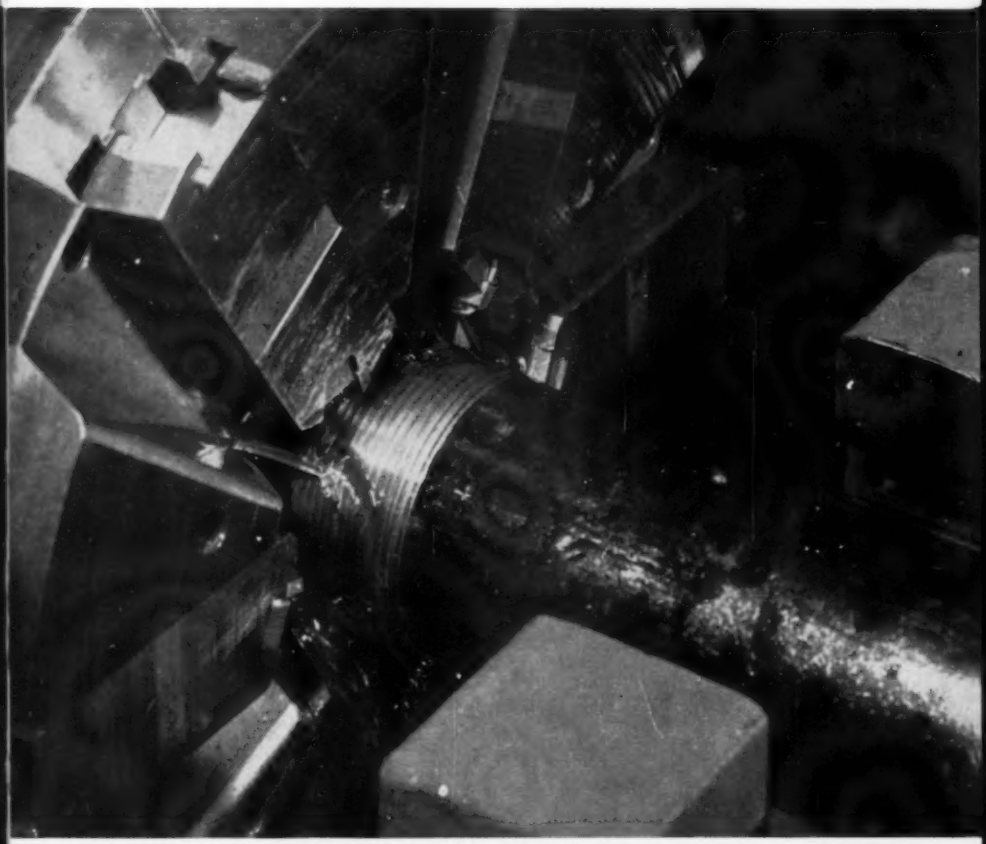
The Universal Drill Bushing Slide Chart gives accurate engineering data for the selection of all types and sizes of drill jig bushings up to 1¾" drill size. You may have one—free—by requesting on your company letterhead. At the same time, get your copy of our new catalog that describes all of UNIVERSAL'S products including chucks, tool holders, boring bars, bushings and index plungers.

UNIVERSAL ENGINEERING COMPANY

FRANKENMUTH 10, MICHIGAN

207

Use postpaid card. Circle No. 211



This is just one of the many applications of Sunicut 85, which is one of a whole series of Sunicuts . . . all transparent.

SUNICUT 85 is a heavy-duty cutting oil that lets you see what you're doing

Transparent, fast-draining Sunicut® 85 leaves the workpiece clear for inspection as you go.

Especially designed for use on high-alloy steels, Sunicut 85 is ideal for heavy-duty work on automatic screw machines and production form grinders. It's a natural for pipe threading and similar heavy-duty operations requiring frequent and close inspection.

Easy pumping, fast metal-wetting, and excellent extreme-pressure lubrication are other advantages of Sunicut that lead to production economy for you.

Ask your Sunoco representative about saving money with Sunicut, or write to Dept. MT-2

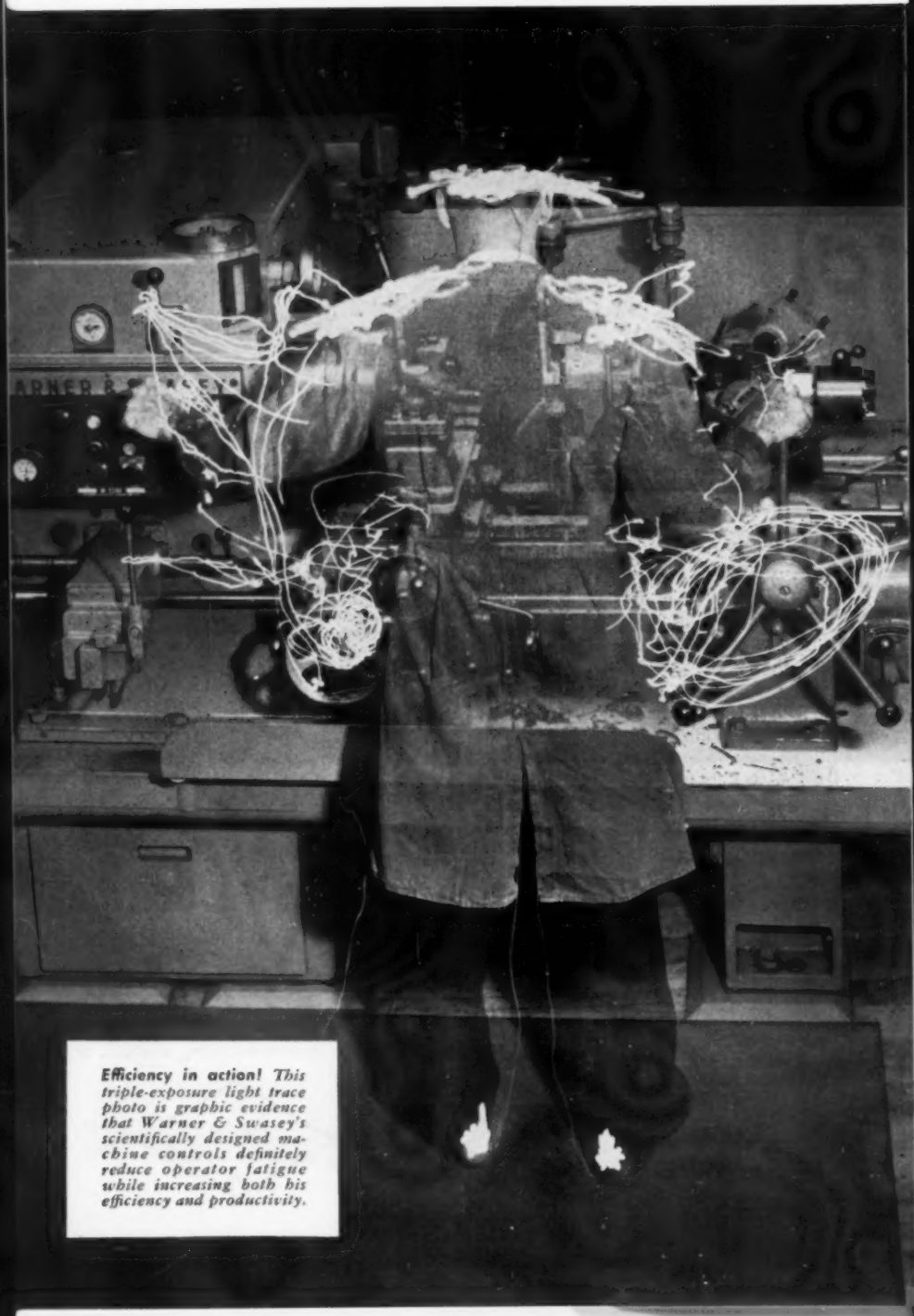
Industrial Products Department

SUN OIL COMPANY, Phila. 3, Pa.

SUNOCO

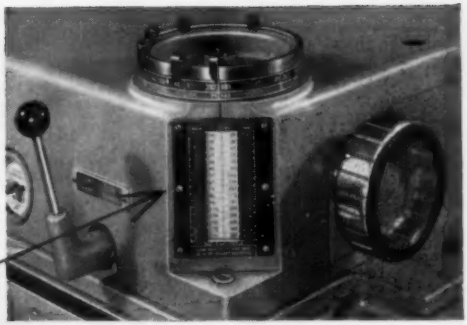
In Canada: Sun Oil Company Limited, Toronto and Montreal.

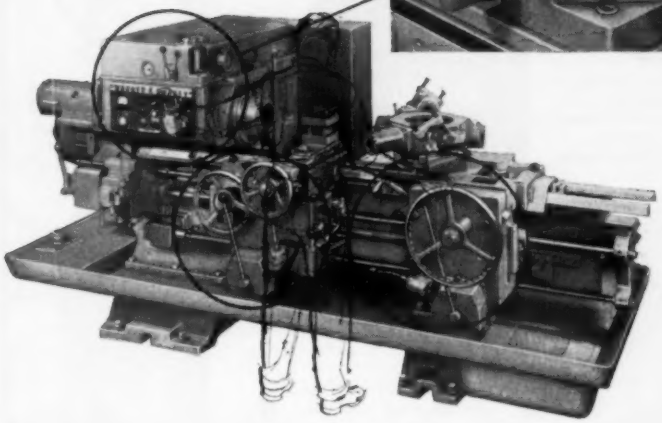
Use postpaid card. Circle No. 212



Efficiency in action! *This triple-exposure light trace photo is graphic evidence that Warner & Swasey's scientifically designed machine controls definitely reduce operator fatigue while increasing both his efficiency and productivity.*

This exclusive Warner & Swasey Speed Preselector, heart of the "zoned controls" system, enables the operator to preselect the correct speed for each cut, with just a glance-and-a-twist of the hand wheel.





Warner & Swasey Zoned Controls boost production by helping increase operator efficiency

KNOWN throughout industry as "the operator's machine", Warner & Swasey turret lathes are painstakingly designed with the human element in mind. They provide easy-to-handle operating controls, compactly arranged at convenient levels that minimize stooping and reaching—all of which contribute to increased operator satisfaction and higher production. Heart of the "zoned controls" system is Warner & Swasey's exclusive Speed Preselector—calibrated in surface feet and spindle RPM's versus work diameters—that encourages operator use of the proper spindle speeds for the particular job being machined. Additional single lever control features praised by operators include: A fast, simple change for spindle speeds; apron feed levers with "feel" control; four-way carriage rapid traverse; easy operating turret units and hydraulic collet chuck and bar feed control. For more detailed information about the adaptability of Warner & Swasey turret lathes to your particular machining problems, call in our Field Representative, today.

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

Use postpaid card. Circle No. 213

Cooley

ELECTRIC HEAT TREATING FURNACES

35 Models

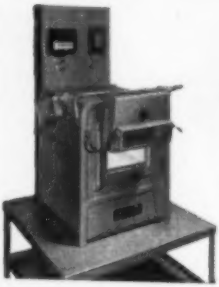
WITH AND WITHOUT

Controlled Atmosphere

ELECTRIC OVENS

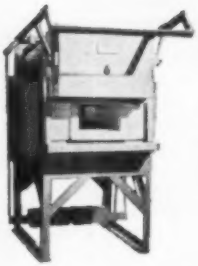
New GA batch type controlled atmosphere furnace designed for tool rooms and small production. 2 models now ready—others to follow.

Recirculating Air Draw: box type furnace for controlled heating to 1300° F.—steel tempering, glass annealing, etc. 8 sizes to 24″ w. x 15″ h. x 48″ d.



Bench Type: for tools and small parts—to 2000° F. 14 sizes to 10″ w. x 8″ h. x 18″ d.

Recirculating Ovens: for drying, finishing and industrial processing to 600° F. 5 sizes to 36″ w. x 36″ d. x 60″ h.



High Temperature Box Furnace: for high speed steel treating to 2500° F. 3 sizes to 12″ w. x 8″ h. x 24″ d.

Industrial Box Furnace for general heat treating—to 2000° F. 8 sizes to 24″ w. x 18″ h. x 48″ d.

Catalog and complete information on any of these furnaces will be gladly furnished on request.

COOLEY ELECTRIC MANUFACTURING CORPORATION

36 S. SHELBY ST. • INDIANAPOLIS 7, INDIANA

Use postpaid card. Circle No. 214

JOHANSSON GAGING EQUIPMENT

Assures You Precision to the Finest Degree to Meet Your Requirements —Backed by the Name Supreme in the World of Measurement

GAGE BLOCKS

(JOHANSSON) and accessories. Short deliveries. Inspection and reconditioning service available at our plant.

INTERNAL INDICATORS

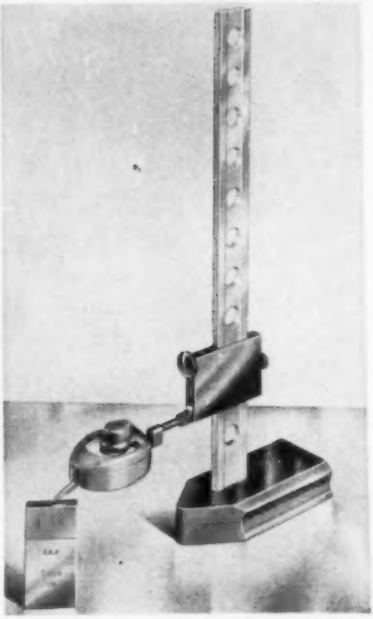
(for inside measurements .155 to 24 inches). Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

MIKROKATOR

(Amplifier—for outside measurements) Graduations .0001 to .000001 or .01M to .0002M.

OTHER JOHANSSON PRODUCTS

Micrometers, Snap Gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators, Interferometers, Plugs, Rings and Special Gages.



MINIKATOR
with height gage

The Minikator No. 590 is a micro-indicator especially designed for transferring dimensions and measuring in otherwise inaccessible places. The instrument is particularly suitable for indicating out-of-roundness or concentricity of grinding machine spindles and for locating drilling jigs.

The amplification device of the Minikator is based on the Mikrokator Principle, it is purely mechanical and without friction and slackness. Measuring points of two different lengths $^1/_{16}$" diameter are supplied with every instrument. One point provides a measurement range of .003" (0.08 mm) with .00005" (0.001 mm) dial graduations and the other provides a range of .006" (0.16 mm) with .0001" (0.002 mm) dial graduations.

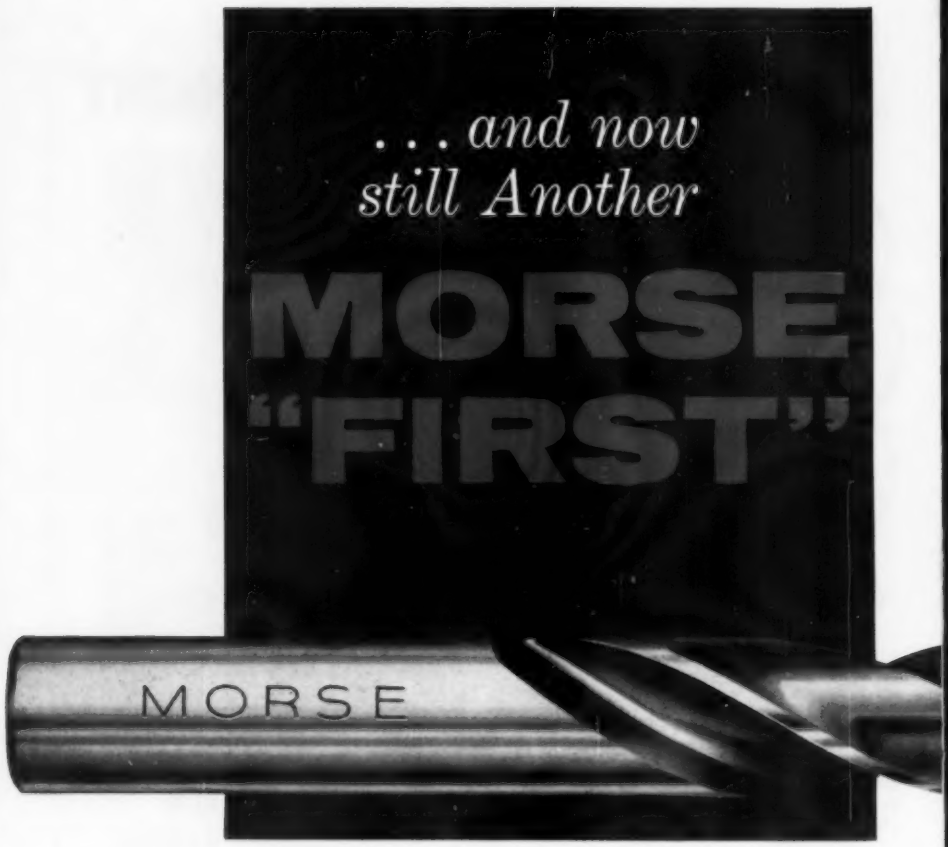
Write for Literature

C. E. JOHANSSON GAGE CO.

A DIVISION OF SWEDISH GAGE CO.

10641 HAGGERTY AVE. • BOX 4086 NORTHEASTERN STATION • DEARBORN 1, MICH.

Use postpaid card. Circle No. 215



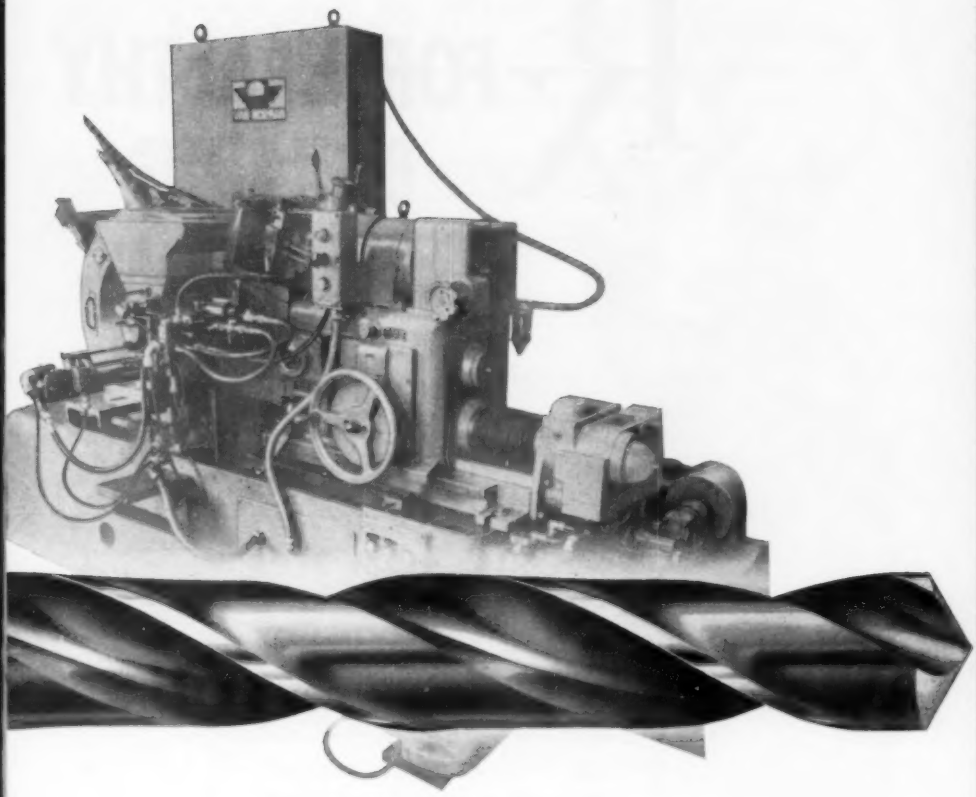
Quality Precision Grinding stepped VAN NORMAN Centerless Grinder

Ever since Stephen Morse produced the first twist drill, Morse has been the leader of progress in cutting-tool production methods.

Electrolizing . . . Vectormatic Taps . . . Morse's flute-grinding process . . . these are some of the Morse milestones in supplying better and better cutting tools to industry.

Now here's another step ahead . . . centerless grinding of drills on this new high-precision, high-production Van Norman Diversimatic machine, specially adapted to Morse requirements.

To *you*, this means *new high standards* of uniform quality and prompt delivery. See your Morse-Franchised Distributor *today*.



up with this NEW

MORSE *means* "THE MOST" *in Cutting Tools*

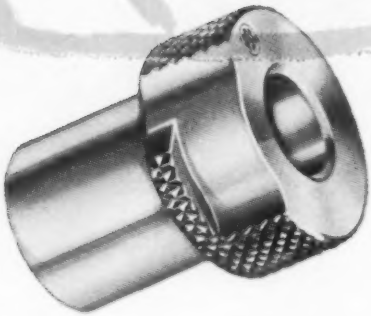
MORSE TWIST DRILL & MACHINE CO., NEW BEDFORD, MASS.

Warehouses in: New York • Chicago • Detroit • Dallas • San Francisco

Division of VAN NORMAN INDUSTRIES, INC.

Use postpaid card. Circle No. 216

Rx FOR HEALTHY DRILLING OPERATIONS



1 **USE ACCURATE DRILL JIG BUSHINGS**—made of high carbon, chrome bearing steel—exclusively.

2 **INSIST UPON ACCURATE BUSHINGS**—the bushings that have precision ground and honed holes — outside diameters and shoulders ground concentric and square—bushings that are consistently uniform and dimensionally stable.

3 **TAKE ADVANTAGE OF ACCURATE'S SERVICE**—all standard sizes shipped "same day" your order received —complete stocks maintained at factory and convenient warehouse locations.

ABC

Call or write today for free ABC Bushing catalog and price list.

ACCURATE BUSHING CO.

444 North Avenue, Garwood, New Jersey

ASA Standard Drill Bushings • Precision Parts • Lift-Swing Drilling Fixtures

Use postpaid card. Circle No. 217

"Far Superior to its Competition"...

. . . states Mr. Creighton Blanchard, toolroom superintendent at New Hampshire Ball Bearings, Inc., Peterborough, New Hampshire

THE NEW, IMPROVED THOMPSON TYPE D HAND FEED

SURFACE GRINDER

is winning enthusiastic approval wherever precision work is required

Here's what Mr. Blanchard has to say about the new Type D machine:

"We have three grinders in our toolroom—a Thompson and two competing machines. In our general toolroom grinding, especially on carbide and hard metals, we find the Thompson Type D so superior that we have recently purchased another Thompson just like it. All our precision work goes on the Thompson."

Compare these features

- Steel roller anti-friction slides eliminate ball creep and increase rigidity.
- 14" standard vertical capacity under 7" wheel at no extra cost with no loss in vertical capacity when using wet attachment.
- Solid support through entire length of bearing quill assures extra fine finish.
- 5 inch table movement per turn of handwheel improves quality of finish and speeds up operations.
- No backlash, anti-friction ball nuts and screws on cross feed prevent wheel from creeping away from work in shoulder grinding.
- Swing-out stop for table dog contact permits quick movement to wheel dresser.
- Immediate delivery available.

Send for descriptive literature on the new Thompson Type D Grinder.

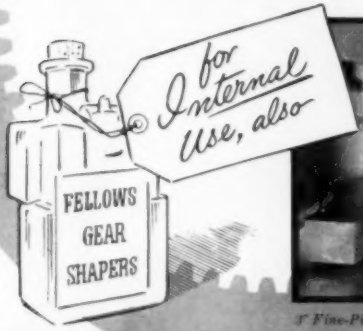
THE THOMPSON GRINDER CO.
SPRINGFIELD, OHIO

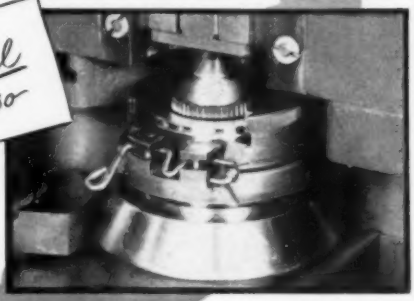
"Keep Thompson in mind for that daily grind"

Thompson SURFACE GRINDERS

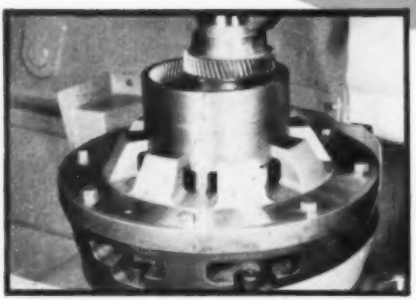
Use postpaid card. Circle No. 218

FELLOWS GEAR SHAPERS
cut INTERNAL Gears

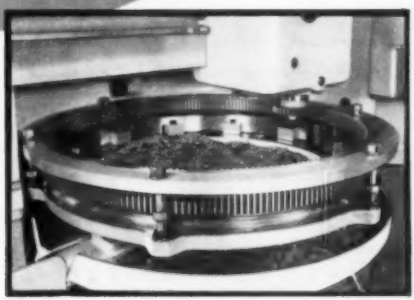




7" Fine-Pitch Gear Shaper cutting internal gear.



No. 10 Rotary Gear Shaper cutting internal helical.

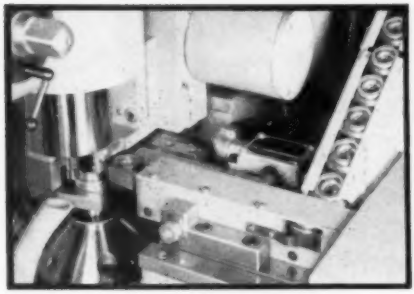


36-Type Gear Shaper with special work-holding fixture.

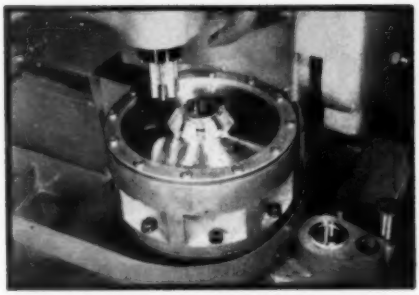
120" Gear Shaper cutting light tank turret gear.

THE
PRECISION
LINE

as EASILY as Externals



4GS Gear Shaper with full-automatic operation.



7A-Type Gear Shaper with fast-action diaphragm chuck.

Not only internal gears, but splines, clutches and an almost unlimited variety of other internal shapes can be produced on versatile Fellows Gear Shapers just as simply, rapidly and economically as external shapes. In many cases, the same Gear Shaper cutter can be used to cut both internal gears and their mating pinions.

Set-ups and change-overs are simple and fast on any Gear Shaper from the 3-Inch Fine-Pitch to the 120-Inch. Rigid construction makes it possible to hold close tolerances at high production rates. On some models, full or semi-automatic operation is available whenever the size and shape of the work and the production requirements make it practical.

Your Fellows Representative can give you full information about the production benefits of Fellows gear shapers, shaving machines, grinding machines, inspection instruments, or cutting tools. Just contact the nearest Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices: 1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

Fellows *Gear Production Equipment*

Use postpaid card. Circle No. 220

You don't have to see the "Red End" to know it's a

SIMONDS

HACKSAW BLADE

Just put it to work ... that's all!

Performance speaks for itself. And if you think there's no difference in hacksaw blades, try this:

TEST 1 BOX OF 10 SIMONDS "RED END" BLADES AGAINST ANY 10 OTHERS

Then you'll know you're getting more for your hacksaw dollar than you ever got before. And then you'll see why so many other hacksaw users "Say Simonds and Save!"

Simonds "Red End" Power Blades come in All-Hard and Shatterproof types in all standard lengths, thicknesses and tooth spacings . . . a "right" blade for every job! Three types of Hand Blades are also furnished in all standard specifications for best results at lowest cost.

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

For Fast Service from Complete Stocks Call your **SIMONDS Industrial Supply DISTRIBUTOR**

Use postpaid card. Circle No. 221

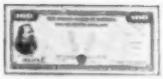
An accountant gave us an idea that adds up

"I wish I had a plan to make me *save*, every single payday," our accountant remarked.

We explained that we have the finest kind of mechanism for regular savings – the plan for buying U. S. Savings Bonds through Payroll Savings. But she had given us an idea.

We put in a call for our State Savings Bond Director. He sparked a company-wide plan that told our people about systematic buying of U.S. Savings Bonds. Every person on our payroll received an application card.

Within days we had the best employee participation we've enjoyed since the mid-forties. It showed that people welcome a chance to set up this soundest of investment plans. Today there are more payroll savers than ever before in peace time. Look up your State Director in the phone book or write: Savings Bonds Division, U.S. Treasury Dept., Washington, D. C.

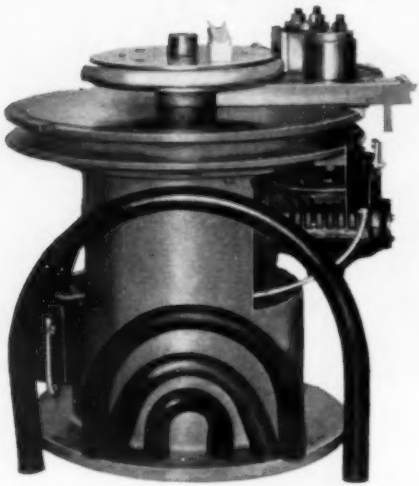


MACHINE and TOOL BLUE BOOK
(A Hitchcock Publication)

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Use postpaid card. Circle No. 223

any size or shape



Whatever the size or shape of the bend for your pipe, tube or structural metal part, a PEDRICK PRODUCTION BENDER can do the job fast, accurately and economically. Let us demonstrate. Write PEDRICK TOOL AND MACHINE CO., 3640 N. Lawrence St., Philadelphia 40, Pa. Dept. 3.

Free "Pedrick Line" Bulletin. Write today.

PEDRICK
PRODUCTION BENDERS

Use postpaid card. Circle No. 225

NOW—A LOW-COST LAPMASTER

Specifically Designed for Maintenance Lapping

new **Lapmaster®** **MODEL 10**

Saves Time and Money On:

VALVE SEATS • MECHANICAL SEALS
COMPRESSOR DISCS • DIESEL INJECTOR
AND OTHER MISCELLANEOUS PARTS

- Faster than old lapping methods.
- *Consistently* laps to flatness within .0000116" and micro-inch finishes of 2 to 3 RMS.
- Operator need not be experienced.
- Handles parts up to 7" diameter to meet all usual maintenance lapping needs.
- Will handle parts of any shape or form . . . any metal, ceramics or plastic.
- Automatically controlled lapping cycle.
- Size: 18" x 13" x 12". Weight: 133 lbs.
- Operates on any 110 volt — 60 cycle — single phase outlet.

NO TIME LOST

in Reconditioning Lap Plate with Exclusive LAPMASTER PRINCIPLE

No down time for truing lap plate . . . conditioning rings automatically keep plate flat and true.

Lapmaster® . . . THE MACHINE THAT PUT PRECISION LAPPING ON A **PRODUCTION** BASIS

WRITE FOR THE COMPLETE LAPMASTER STORY

Write for bulletins describing the Lapmaster line and chart on measuring flatness.

A product of
Crane Packing Company
6412 OAKTON ST. • MORTON GROVE, ILL. (Chicago Suburb)
In Canada: Crane Packing Company, Ltd., Hamilton, Ont.

Use postpaid card. Circle No. 226

At the Latin American Division Overhaul Base in Miami, Fla., Pan American World Airways System has been using a Rivett Model 1024 Internal and Universal Grinder on small hole work for 3½ years.

Pan Am states: "*The Rivett Grinder is in operation during two eight-hour shifts per day, five days per week. The only service has been lubrication and replacement belts. It is considered the most accurate and productive universal grinder in the shop. We have another machine on order.*"

Write for free copy of Bulletin 1024B and get the details of how Rivett can improve your toolroom and small lot grinding.

RIVETT LATHE & GRINDER, INC., BRIGHTON 35, BOSTON, MASS.

Rivett Lathe & Grinder, Inc.

Dept. MMR1 Brighton 35, Boston, Mass.
Send Free 12-page Catalog **MTR 2**

Name_____

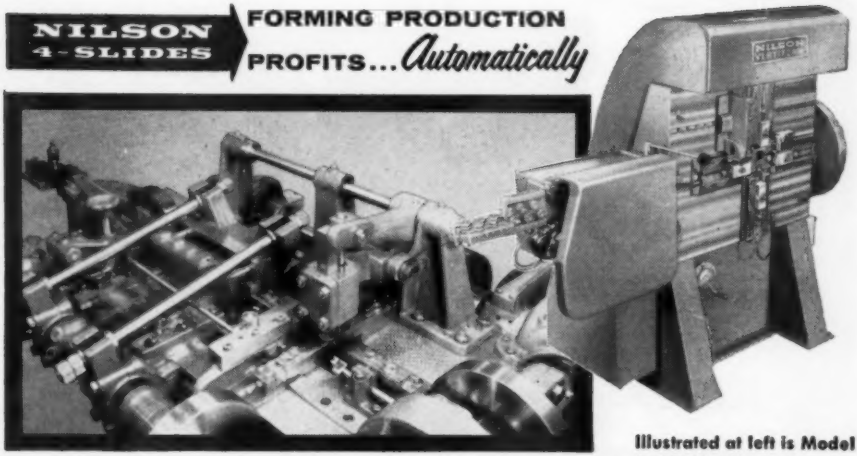
Company_____

City_____ State_____

RIVETT

Use postpaid card. Circle No. 1a

NILSON 4-SLIDES FORMING PRODUCTION PROFITS... *Automatically*



Illustrated at left is Model S-1-F Machine, showing built-in press and open construction of forming area. Directly above is the new Vertiform Machine.

WHY Cost-Conscious Companies CHOOSE A NILSON

Every Nilson 4-Slide Forming Machine is designed with built-in flexibility! Most models handle either wire or ribbon metal with equal speed and accuracy . . . can combine stamping, welding and other secondary operations with the basic forming cycle. Easy access to tooling insures rapid setups, minimum down-time for job changeovers.

Whatever your forming application, there's a Nilson 4-Slide to do the work faster, more economically! With 17 horizontal models and the new "Vertiform" machine, Nilson offers you the widest selection of 4-slide equipment.

Investigate the cost-cutting advantages of Nilson 4-Slides in your operations! For a production evaluation of your parts, send prints or samples today.

SIZE RANGES:
Wire up to ½" diameter
Ribbon stock to 3½" wide,
Feeds up to 32"
5 TO 75 TON
PRESS SECTIONS

NILSON
THE A. H. NILSON MACHINE CO.
1504 Bridgeport Avenue • Shelton, Conn.

AUTOMATIC WIRE & RIBBON METAL FORMING 4-SLIDE MACHINES • WIRE & STOCK REELS • WIRE STRAIGHTENING EQUIPMENT • AUTOMATIC STAPLE FORMING MACHINES • SPECIAL WIRE FORMING EQUIPMENT

Use postpaid card. Circle No. 228

Here's a Battery of PROFIT PRODUCING PERKINS PRESSES

For years some of the largest metal working plants in the country have used batteries of Perkins Presses to economize on space, lower production cost and ease of operation. They're the LITTLE GIANTS of the industry. Sturdy . . . Versatile . . . Economical.

Shown here is the Press Room of the Acme Chain Corp. of Holyoke, Mass., now operating 175 Perkins Presses. Before you buy, check the economical price of these long-life profit-producing Presses.

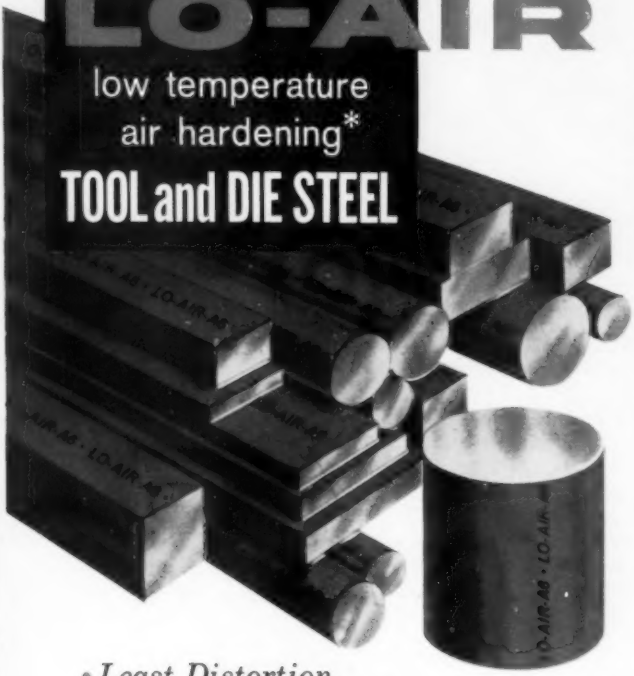
PERKINS
MACHINE COMPANY
WARREN, MASS., U.S.A.

Use postpaid card. Circle No. 229

Announcing...

LO-AIR®

low temperature
air hardening*
TOOL and DIE STEEL



- *Least Distortion*
- *Easy to Machine*

New from Universal-Cyclops, LO-AIR is an air hardening tool steel remarkably free from distortion in hardening. Even more remarkable is its ease of machining. Now you can combine the simplicity of hardening and ease of machining typical of oil hardening tool steel (AISI 01) with the safety of an air hardening grade. Write for our descriptive brochure No. TS-101, or better yet order a bar from your nearest Universal-Cyclops sales office or warehouse. Complete stocks are available.

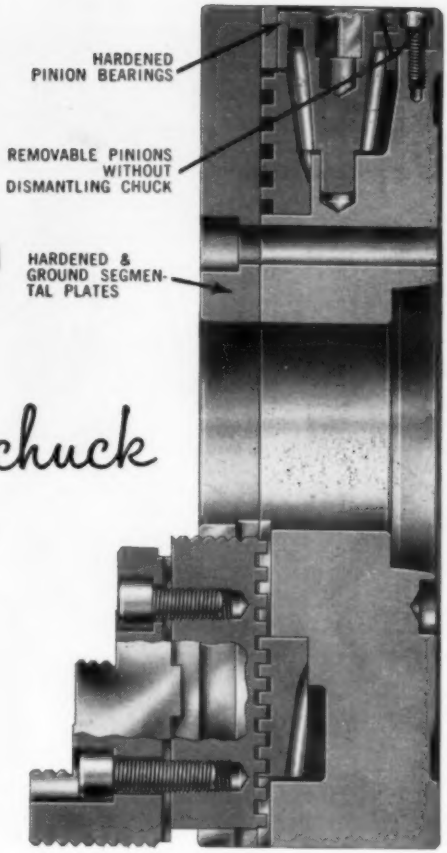
**U. S. PAT. NO. 2,355,244*

UNIVERSAL CYCLOPS
STEEL CORPORATION
BRIDGEVILLE, PA.

TOOL STEELS • STAINLESS STEELS • HIGH TEMPERATURE METALS

BLANKING
STAMPING
TRIMMING
COINING
EMBOSSING
PUNCHING
PIERCING

Use postpaid card. Circle No. 230



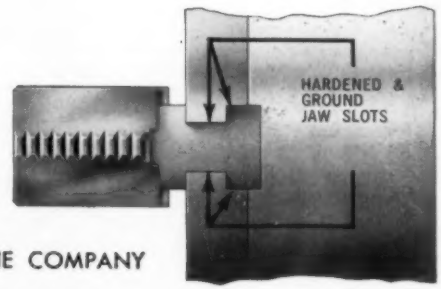
The Right chuck

FOR THE JOB!

Whiton's universal geared scroll 3-jaw chuck is the right chuck for high-precision work and long dependable service. A major improvement over the conventional chuck, it features jaw slots formed by separate plates hardened and finish ground before mounting on the chuck body.

Whiton hardened plate type chucks available from 6" to 15" diameter for American Standard Spindle Noses; Types A, D, & L. Furnished with style No. 6 American Standard Tongue and Groove type reversible jaws.

Complete technical information available on request.



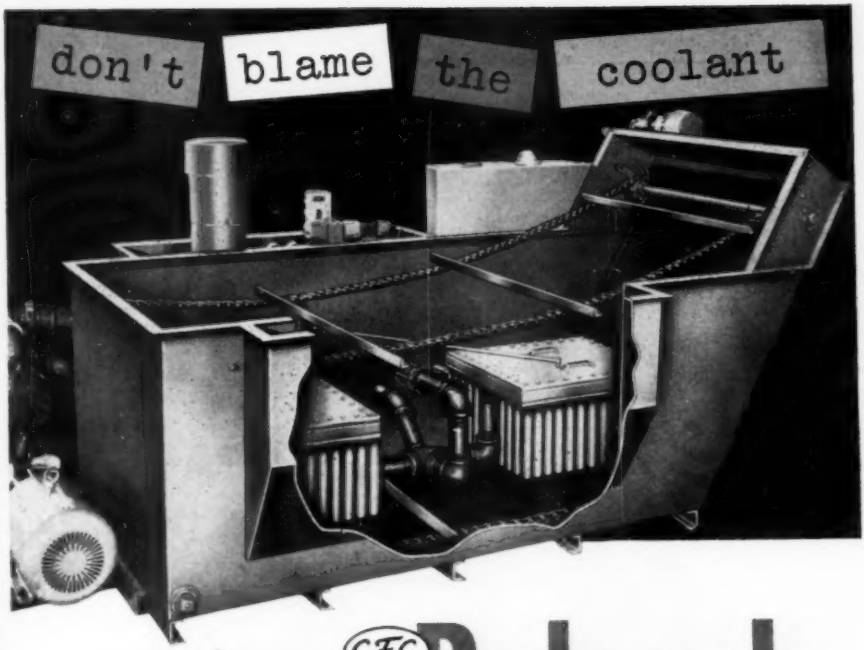
Whiton SINCE 1856

THE WHITON MACHINE COMPANY

•

NEW LONDON, CONN.

Use postpaid card. Circle No. 231



assure longer life, better quality with

CFC Delpark

FILTER-MATIC

If dirty coolant is fouling up your work, the CFC Delpark Filter-Matic may be the simple remedy.

Delpark Filter-Matic keeps coolants clean, protects both machine tools and process work. You save money through longer coolant life.

CFC Delpark Filter-Matic gives *constant vacuum filtration* of coolants, cutting oils, rolling oils, solvents and other fluids. Dual manifold design allows uninterrupted filtration — one manifold on filtering cycle while the other is on backwash or cleaning. Pre-coat filter aids may be used to give absolute filtration.

Write for technical literature to Dep't **MT**

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo Filters — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC Filters — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

Use postpaid card. Circle No. 232

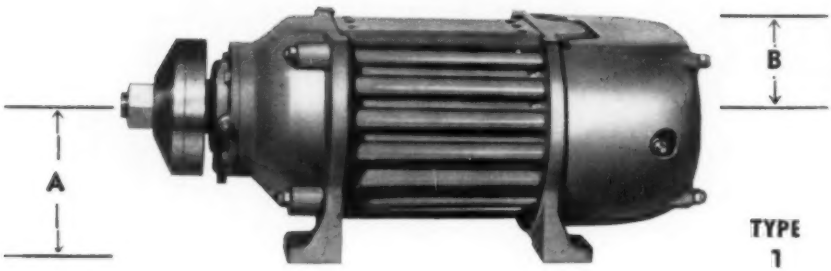
Serving the Industry Since 1852

Specify

WOODS® MOTOR ARBORS

for MORE POWER

in LESS SPACE



TYPE 1

"A" DIMENSION	HP at 3600 RPM	FRAME SERIES	"B" DIMENSION
4½"	1 - 7½	20	3¼"
5⅛"	1 - 20	30	4"
6½"	5 - 30	40	5⅛"
8⅜"	20 - 60	50	7-1/16"

Send for descriptive material

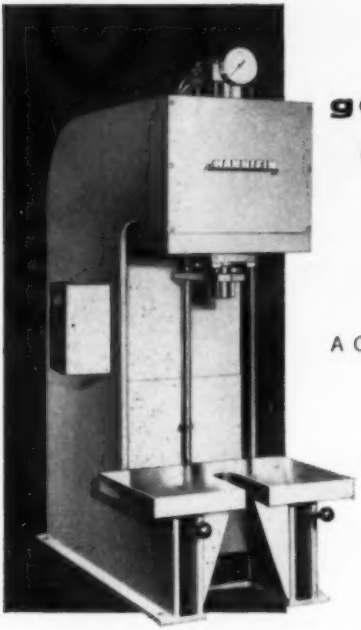
MOTOR DIVISION

S. A. WOODS MACHINE CO.®

27 DAMRELL STREET

BOSTON 27, MASS.

Use postpaid card. Circle No. 233



get more production at lower cost with

HANNIFIN

"FD" PRESSES

•

A COMPLETELY NEW LINE OF HIGH-SPEED HYDRAULIC BENCH PRESSES

•

FAST DELIVERY—ALL THESE SIZES!
2, 3, 4, 5, 6, 8, 10 and 12 TONS

•

HEAVY-DUTY OPEN-GAP PRODUCTION PRESSES

Our quantity production gives you highest quality at lowest cost.

THEY HAVE "EVERYTHING"...

Dual Safety Hand Lever Controls
Dual Electric Push-Button Controls
Adjustable Stroke Control
Reverse on Pressure or Distance
Full Automatic Cycling
Hannifin High Speed Hydraulic Index Tables
Reciprocating Hydraulic Slide Feeds

USE THEM FOR...

Assembly Operations
Riveting – Staking
Forming – Stamping
Trimming Die Castings
Trimming Plastics
Molding Semi-Conductors
Preforming – Compacting

MAY BE FLOOR MOUNTED – OPTIONAL, LOW-COST BASES AVAILABLE

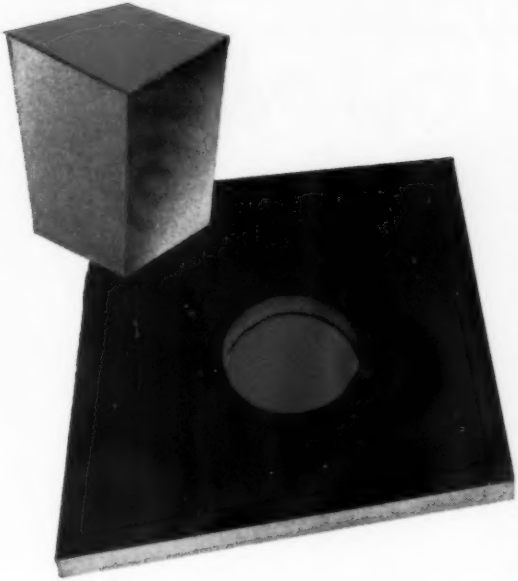
Call in your nearby Hannifin man—he's a trained production analyst—to prove how you can do more at lower cost with Hannifin presses. Or, write for our new Bulletin 132A. It tells the whole story.

HANNIFIN COMPANY

529 South Wolf Road • Des Plaines, Illinois

A DIVISION OF PARKER-HANNIFIN CORPORATION

Use postpaid card. Circle No. 235



There is an interesting "Inside Story" about Ace Drill Bushings. Because the walls, inside and out, are consistently || parallel, this greater drill bearing surface produces better work with longer life of both drill and bushing.

Ace Drill Bushings are made right . . . to wear right. They guarantee a maximum concentricity of .0003" t.i.r. . . . usually it is far less. You can depend upon ACE Drill Bushings. They are consistently **the best** in every way. **Always specify ACE!**

Inconsistency!

Does anyone expect perfect teamwork between a straight drill and a ( ) barreled out or a) (bell-mouthed drill guide? Of course not! That's as inconsistent as looking for close tolerance between a square peg and a round hole.

If your drilling operations demand maximum accuracy, **THINK FIRST OF ACE . . .** the proven superior precision drill guide.

ACE DRILL BUSHINGS

NEW JERSEY
611 McCarter Highway
NEWARK 2
Mitchell 2-3006

ACE

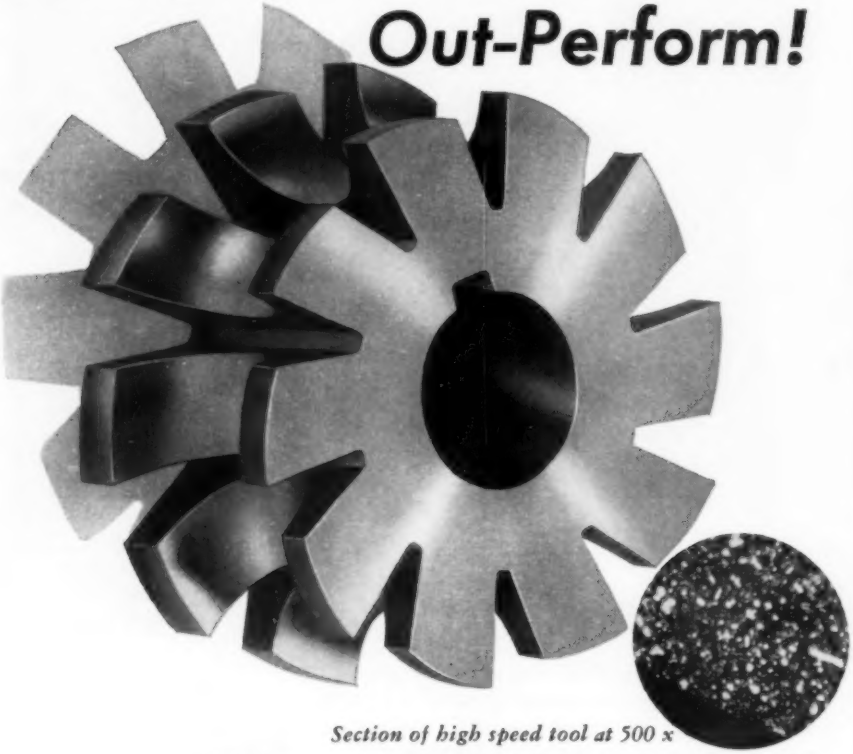
HOME OFFICE
CALIFORNIA
5407 Fountain Ave.
LOS ANGELES 29
HOllywood 9-8253

ACE

MICHIGAN
10620 West Nine Mile Road
DETROIT 37
Lincoln 8-0777

Use postpaid card. Circle No. 236

Sentry-Hardened Tools *Out-Perform!*



Section of high speed tool at 500 x

The truly neutral Sentry Diamond Block atmosphere permits ample soaking of all high speed or high carbon high chrome production tools to assure uniform hardness throughout.

Original sharp edges are retained through the hardening cycle. There is no scale and no decarburization. As a result, tools hardened the Sentry way give maximum service under difficult working conditions.

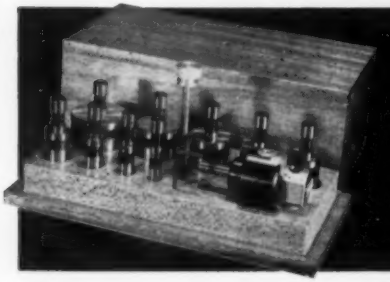
A demonstration of hardening on your own tools will be convincing proof of Sentry benefits. You're invited to send us samples.

Sentry TRADEMARK **ELECTRIC FURNACES**

Request Catalog • *Write* **THE SENTRY CO., FOXBORO, MASS.**

Use postpaid card. Circle No. 237

take the guess-work out of Profiling !



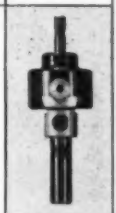
with an

Adjustable

STYLUS HOLDER

9 Stylii will cover complete work range

9



70

70 or more stylii formerly required for complete work range

DEFLECTION PROBLEM SOLVED
Compensate for any amount of deflection with a simple, quick adjustment.

MINIMUM DOWN TIME
Eliminate search for matching cutter and stylus. Select cutter, then adjust holder to proper size.

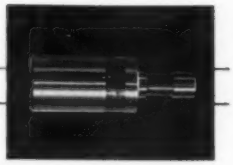
CUTTER COST REDUCED
Prolong cutter life — regrind to sharpen only — size is no factor. Any size cutter performs equally well as new one.

GREATER ACCURACY
Accuracy no longer depends on finding stylus and cutter of exact size. The micrometer screw in the adjustable stylus holder permits controlled stock removal.

MINIMUM STYLII REQUIRED
Nine stylii do work of 70 to 100. In 3 dimensional work, when cutter change is required, stylus need not be replaced.

TEMPLATE ERRORS CORRECTED
These discrepancies in template can often be "adjusted out" while cutter is in motion.

CRITERION
TOOL PRODUCTS



CRITERION MACHINE WORKS

765 WEST SIXTEENTH STREET

COSTA MESA, CALIFORNIA

Use postpaid card. Circle No. 239

no other wear plates now offer this tremendous advantage

O-KNI-CO clad aluminum bronze wear plates are a combination of ¼" thick aluminum bronze eternally clad to a tough, easily machinable steel backing. Unlike ordinary thinly coated products, O-KNI-CO clad aluminum bronze wear plates deliver phenomenally long wear. Their steel backing gives great strength. You receive them completely finished, ready to install. Available in 14 standard cross sections from ½" to 1¼" thickness, 1½" to 8" width, up to 72" length. Special sizes furnished to your requirements. Drilling and counter-boring can be done through bronze if required.

Their many applications include use as slides in cam and trim dies, or wherever there is a sliding action between flat metal parts. Hundreds of machine tool builders and users are enjoying the many advantages of O-KNI-CO aluminum bronze wear plates. If you are contemplating using bronze wear plates it will pay you to consider the many, many dollars you will save in replacement costs alone when you purchase long wearing O-KNI-CO .250 thick bronze wear plates. If you are now a user of solid bronze wear plates, O-KNI-CO offers you approximately 40% savings in initial cost alone and delivers the same performance. Immediate delivery available on standard sizes. Data Sheets illustrating applications are available by writing **Dept. 79—D**

THE OHIO KNIFE CO.

CINCINNATI 23, OHIO

SLITTER KNIVES • SHEAR BLADES • BRONZE WAYS • WORK-REST BLADES • CUT-OFF BLADES
SCRAP CHOPPERS • HARDENED SPACERS • BALL RACES • HARDENED WAYS • WEAR STRIPS • GIBS

Also in wide usage are O-KNI-CO Clad Aluminum Bronze Ways and Gibs. Ideally suited to run against O-KNI-CO Hardened Ways.

Use postpaid card. Circle No. 240

The BAKER BASIC approach to production flexibility and retooling economy

BAKER®

interchangeable heads . . . and tables

BAKER BASIC STANDARD VERTICAL MACHINES AVAILABLE IN 12", 18", 24" WAY WIDTHS

* The same selection of fixed and adjustable spindle heads can also be used interchangeably with BAKER HORIZONTAL models in 12", 18" and 24" way widths. For the complete, illustrated story of BAKER VERTICAL AND HORIZONTAL HYDRAULIC DRILLING AND TAPPING MACHINES, write for new free catalogs. BAKER BROTHERS, INC., ADDRESS DEPT. MT-259, TOLEDO 10, OHIO.

BAKER®

STANDARD HYDRAULIC MACHINES • AUTOMATIC BAR MACHINES • SPECIAL MACHINE TOOLS • COMPRESSION MOLDING MACHINES

Use postpaid card. Circle No. 241

For DEBURRING, CHAMFERING, RADIUSING, FITTING . . .

Master mechanics, tool and die makers always use INDIA and Hard ARKANSAS oilstone files for precision work. They hold their shape longer and won't dull. Send for FREE Hand Stoning Handbook — Dept. BB-2.

Use postpaid card. Circle No. 242

NEW!

CHALLENGE .625"
PRECISION TURRET LATHE

for faster handling of secondary operations or short runs on small precision parts

Look at these important new operating features:

(A) AUTO-INDEX TURRET

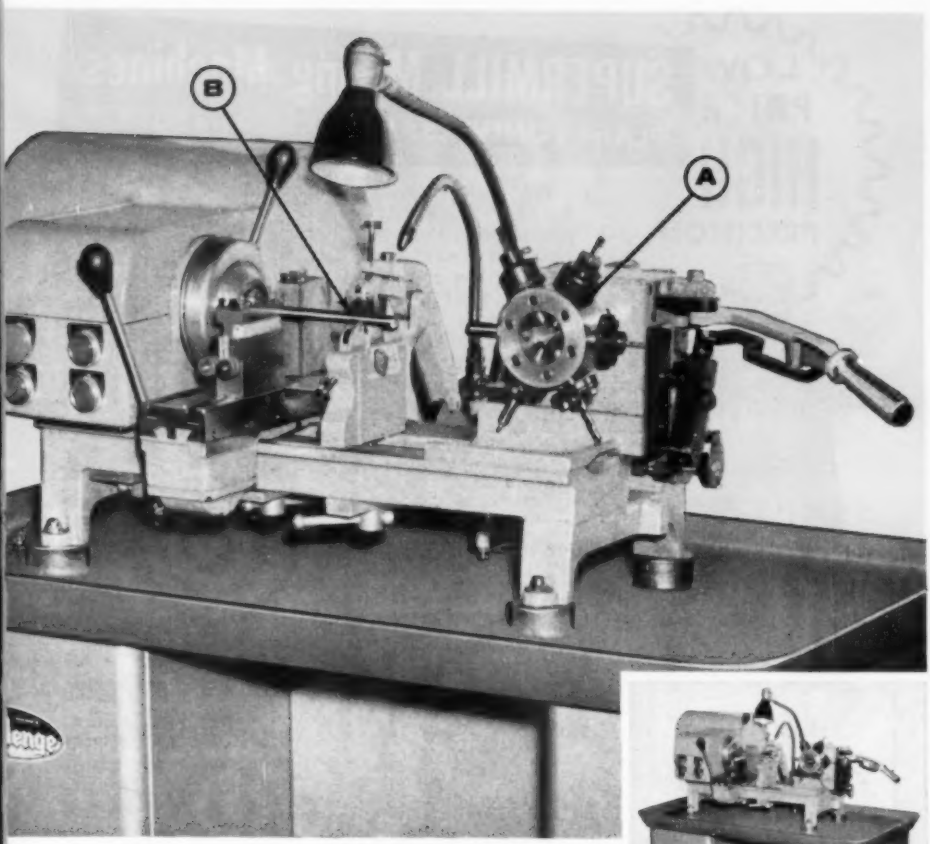
Vertical turret automatically returns to starting position when operating lever is lowered, eliminating need for operator to index through all positions to return to starting position. Number of work stations desired can be preset.

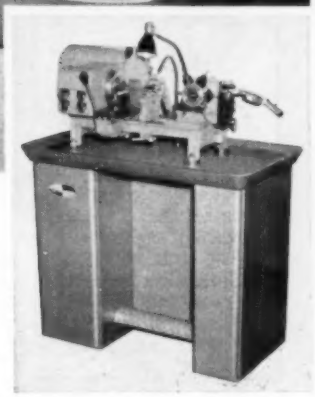
(B) AUTOMATIC STEADY REST

Steady Rest automatically opens when turret indexes back to starting position, speeds removal of work pieces.

You'll want to know all about these and many other cost cutting features of the Challenge 625 . . . push button control, easy collet operation, two-post cross slide.

Available through selected machine tool dealers.
For complete information, write today.





Rigid steel stand is integral part of machine, houses coolant tank and pump. Entire machine is 42" long, 25" wide, 51" high, occupies minimum floor space.

Challenge

THE CHALLENGE MACHINERY COMPANY
103 North First Street
GRAND HAVEN, MICHIGAN

TL-101S

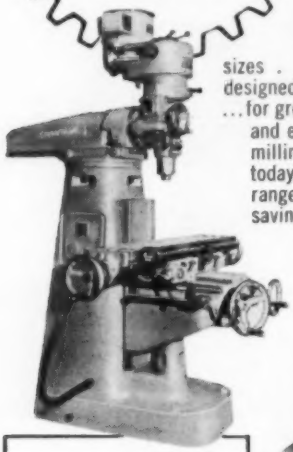
Use postpaid card. Circle No. 243

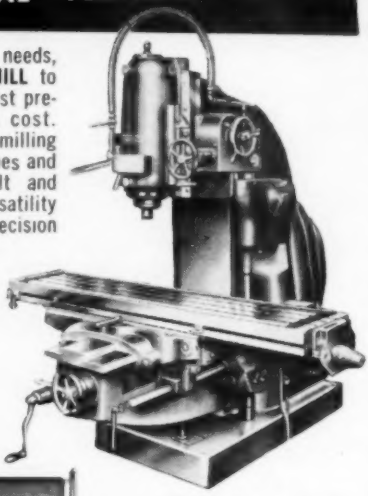
LOW PRICE **HIGH** PRECISION

SUPERMILL Milling Machines

PLAIN • UNIVERSAL • VERTICAL • TURRET

Whatever your needs, there's a **SUPERMILL** to give you the highest precision at lowest cost. Complete line of milling machines of all types and sizes . . . substantially built and designed for strength and versatility . . . for greater power, speed, precision and efficiency. No other milling machines offer today's shops more long-range satisfaction and savings.





SUPERMILL Vertical Turret Mills EXTRA-HEAVY DUTY

Increased accuracy and capacity . . . including extra-heavyweight base, more (1½) H.P., longer table. Any angle milling, drilling and boring for both sensitive and heavy duty work.

from $2,175

SIZES from #1 up to #6 Dual Power

The **SUPERMILL** features **DIAL-TYPE** controls, hardened and ground spindle and gears, anti-friction bearings and many other qualities found only in mills of the highest caliber. A complete selection of optional equipment includes motor-driven universal overarm attachments, dividing heads, vertical and slotting attachments as well as tracing equipment.

from $3,650

Immediate Delivery —
Parts and Service Coast to Coast

Write Today for Detailed Specification Brochures

NEW EQUIPMENT DIVISION

S & S MACHINERY COMPANY

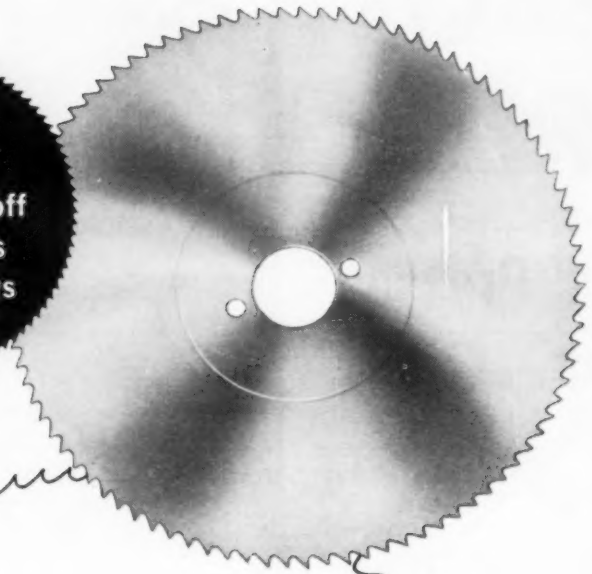
135-53rd STREET
BROOKLYN 32, NEW YORK
HYacinth 2-7400

6945 BANDINI BOULEVARD
LOS ANGELES 22, CALIF
Raymond 3-9231

Use postpaid card. Circle No. 244

NEW

M & M blade speeds up cut-off of soft metals and their alloys



Higher speed to boost output, greater accuracy to step up quality—that's what you'll get when you cut off soft metals and their alloys with Motch & Merryweather's new, specially-engineered PolyMetal Blade.

This new blade is tougher, longer lasting. It's made of special analysis steel that combines desirable hardness, strength, shock resistance, toughness and wear resistance to produce just the right blade for metals like aluminum, magnesium, brass, bronze, copper and their alloys.

In the PolyMetal M&M Blade, you get other outstanding features, too. Typical examples:

- **suitability for use on either hand or mechanically fed sawing machines**
- **uninterrupted performance—month in and month out**
- **easier sharpening to original cutting efficiency without special sharpening equipment**

Learn more about the PolyMetal Blade and the many advantages of making your local M&M dealer your single source for cutting tools. Call him today and whenever you have troublesome cutting problems.

FREE—Send today for your copy of M&M's Circular Sawing Handbook, a pocket-sized guide to sawing operations.

MOTCH AND MERRYWEATHER

Cutting Tool Manufacturing Division
Cleveland 17, Ohio

Q Quality
S Service
A Availability

Use postpaid card. Circle No. 245

3 ways

WT ALKER-TURNER

"Light-Heavyweight"

Drill Presses can cut your production costs

You can't beat these famous Walker-Turner "Light-Heavyweights" for fast, accurate, low-cost drill press operation. Available in 15″ and 20″ floor, bench and single or multiple-spindle production models, with 4¼″ or 6″ spindle travel. Also available as components for building your own automated production machinery. For details, see your W-T distributor (listed under "Tools" in the yellow pages of your phone book).

WRITE FOR FREE CATALOG
on the complete line of W-T "Light-Heavyweights"

WALKER-TURNER
Division of Rockwell Manufacturing Co.
Dept. WB-23, 400 N. Lexington Ave.
Pittsburgh 8, Pa.

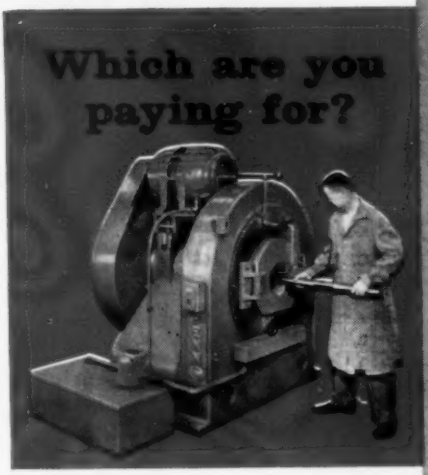
1. As single purpose units

2. As multiple drilling lines

3. As low-cost automated machines (with W-T components)

chips...or parts

Fenn rotary swaging can have an important role in reducing the cost of your product... and making it better. This modern method of chipless part making is fast, versatile, accurate (to ± .001")... saves money and metal. Plenty of it! You save in capital investment, labor, material and time. Here's an example—A precision shaft was formerly made from a five piece assembly at a cost of $130.00. Now, swaged from tubing, it costs $20.00... a savings of 85%. To be sure that you are not paying for chips instead of parts, look into Fenn Rotary Swaging. Write for catalog SM58.

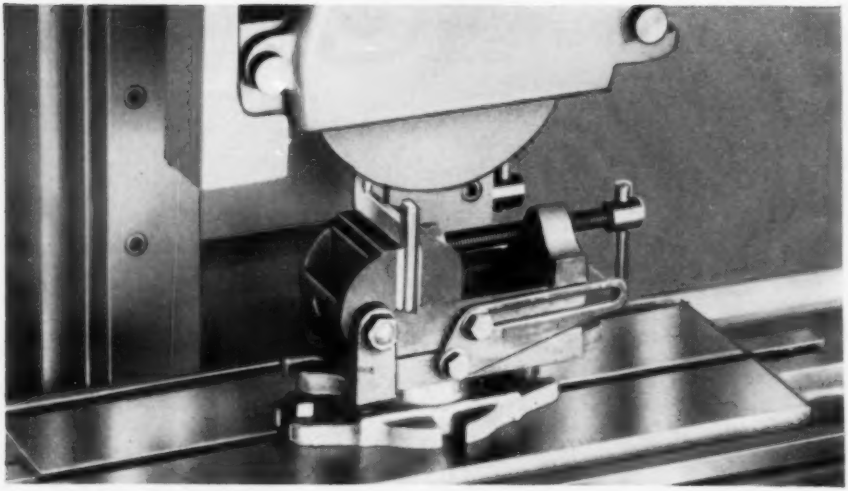


FENN

Sets the Pace
IN ROTARY SWAGING

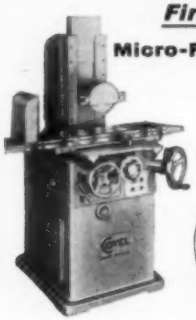
THE FENN MFG. CO., 901 FENN ROAD, NEWINGTON, CONN.

Use postpaid card. Circle No. 247



This is not an ordinary surface grinder at work...

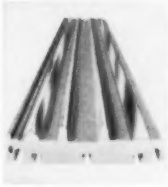
It's a Covel No. 10—built to do MICRO-PRECISION work on accurate snap gages like this. And it also does a top-notch grinding job on other tool room work such as form tools, jigs and dies—day after day and year after year to save you money. Covel pioneered with *hard chrome table ways* that keep this 6" x 18" machine in *top position* in the tool room grinder line-up far longer than grinders with ordinary ways. Covel-developed smooth *timing belt table drive*, hardened and ground lead screws and rigid vertical slide are among other outstanding features that add up to long-lived Covel MICRO-PRECISION performance.



***First* with hard chrome table ways...**

Micro-Precision a Covel Tradition-Since 1874

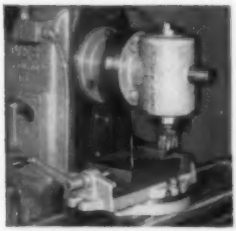
Send today for your copy of "The Covel Precision Story" and complete data on the Covel Surface Grinder that meets your needs — seven sizes from 6" x 12" to 16" x 36". Ask for Bulletin



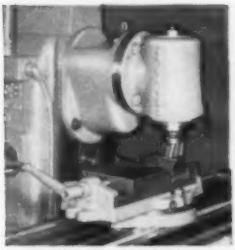
COVEL PRECISION GRINDERS

BB-29 BENTON HARBOR, MICHIGAN

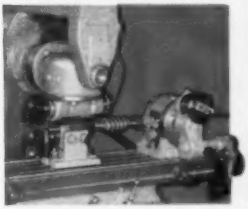
Use postpaid card. Circle No. 248



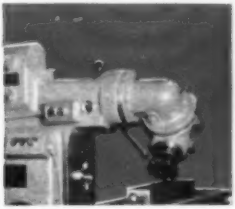
Heavy Duty Vertical Milling Attachment



Heavy Duty Offset Vertical Milling Attachment



Universal Milling Attachment



Toolmakers Overarm

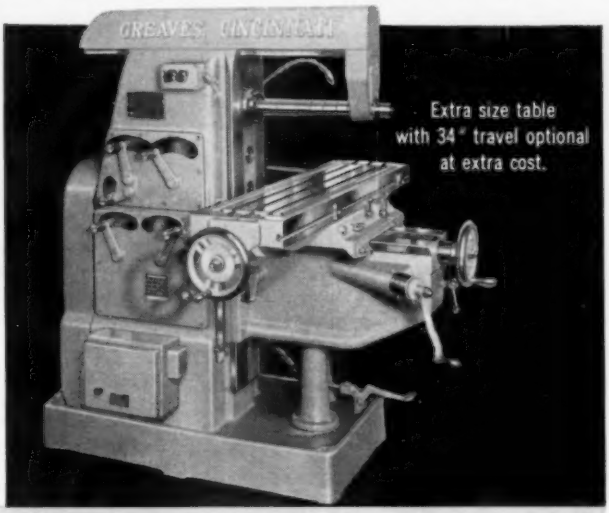
Send coupon for FREE Comparison Chart and detailed descriptive literature on easy-to-use attachments.

Heavy duty attachments increase versatility of dependable, low-cost

GREAVES MILLS

"THE MOST MILL FOR THE LEAST MONEY"

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS. Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.

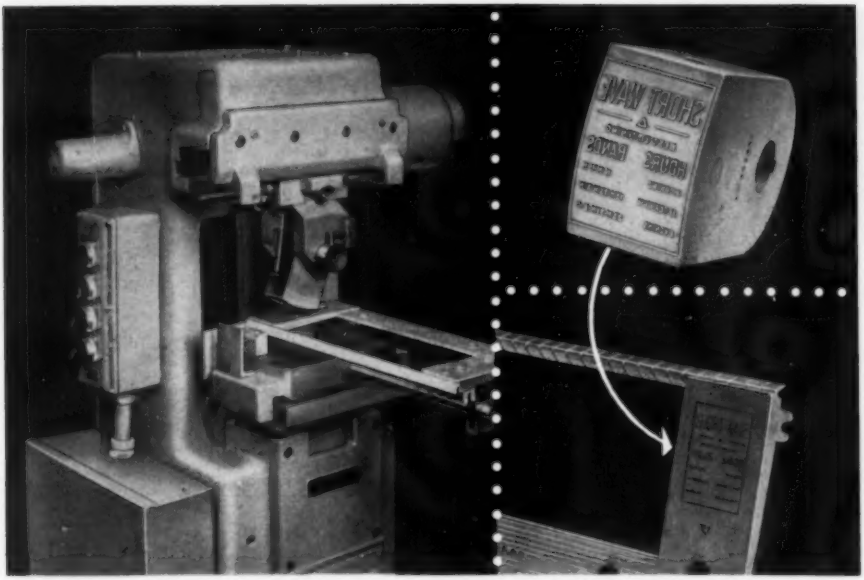


GREAVES MACHINE TOOL CO.
2600 Eastern Avenue, Cincinnati 2, Ohio

—— Send Comparison Chart. I will make my own comparison of GREAVES MILLS with other makes.
—— Send information on Attachments and Accessories for GREAVES MILLS.

NAME _____ TITLE _____
FIRM _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____

Use postpaid card. Circle No. 249



Reciprocatic Roll Marking

for extra deep marking and marking on fragile parts

The new Noblewest Reciprocatic multiple pass roll-making machine was especially developed for extra-deep marking of die cast parts that would be fractured by marking with straight pressure. Illustrated is the all-pneumatic Reciprocatic Model 50P1 shown tooled for marking portable short wave radio panels. Upper right shows Rocker Marker Die and marked panel below. Here, an extra deep impression was *rolled* into the metal by several passes of the die . . . without distortion . . . or fracture. Whatever your needs for metal marking, Noblewest makes the machines, tools and dies for doing the complete job faster, better, at lower cost. Noblewest Roll Marking is *permanent indented* marking—*good for the life of your product.* Write for catalog to Noble & Westbrook Manufacturing Company, 9 Westbrook Street, East Hartford 8, Conn.

A few desirable territories open to qualified representatives.

MARK IT BEST WITH

NOBLEWEST IMPROVED MARKING DEVICES

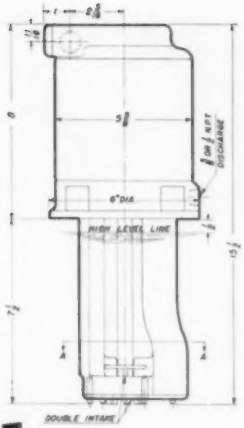
NOBLEWEST

MARKING
NUMBERING
EMBOSSING
GRADUATING

Use postpaid card. Circle No. 250

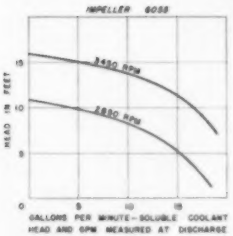
Check

✓ SOUND DESIGN



Designed right, with all the experience that has made Ruthman Gusher Coolant Pumps the leader in their field, Baby Gushers are ideal for machines requiring a nominal volume of coolant.

✓ ECONOMICAL PERFORMANCE



Your Baby Gusher will give you excellent and economical performance on your metal cutting equipment. Pumps up to 25 gallons per minute at 15 foot head. Uses less power when throttled—requires no priming. Coolant flow starts instantly.

✓ LONG LIFE AT MODERATE COST

The original cost of your Baby Gusher is moderate . . . maintenance cost is at an absolute minimum. Pre-lubricated ball bearings need no further attention. No packing or seals. There are fewer parts to wear. No metal to metal contact.

Model 6-P-3 IMMERSED TYPE

You Get All 3 with a

BABY GUSHER

Write for Catalog.

Other models of Baby Gusher and Tank Unit available.

THE Ruthman MACHINERY CO.

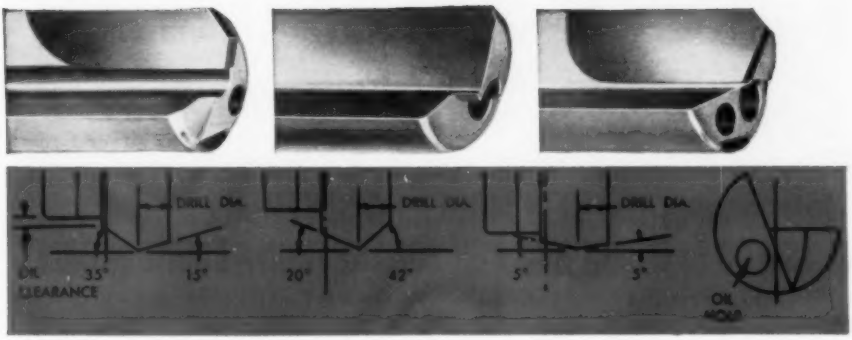
- COOLANT PUMPS
- CIRCULATORS • AGITATORS
- MOLTEN METAL PUMPS

1816 READING ROAD CINCINNATI, OHIO

Use postpaid card. Circle No. 252

R-O RELIEF ALSO...

makes gun drills last longer, cut better and perform more consistently!



Not only does the R-O permit exacting control and duplication in grinding gun drills but it grinds cam relief from edge to heel leaving maximum metal to support the edge and no feather edge to break down. Write for literature and instructions on how to grind gun drills.

RO
UNIVERSAL FORM RELIEVING FIXTURE
R-O Grinder

Royal Oak Tool and Machine Co.
GRINDER DIVISION
29800 Stephenson Hwy.
Royal Oak, Mich.

Please forward the R-O catalog

Firm .....

Address .....

City..... Zone..... State .....

Per .....

Title .....

Use postpaid card. Circle No. 253

Introducing the NEW MODEL 1-A SEVER-ALL Machine... CUTS AT 3 to 6 SECONDS PER SQUARE INCH—ECONOMICALLY

LOW COST • Priced at less than $500, delivered.

BIG CAPACITY • Up to 2" square solids, 3½" O. D. pipe and tubing, 3" angle iron, and 4" channels. Wheel oscillation, an exclusive feature in this price range, provides this *above-average* capacity.

SPEED • Cuts a 2" x 2" hardened steel bar in 16 seconds . . . practically any metal at 3 to 6 seconds per square inch.

QUALITY • Clean, smooth cuts, even on large sections, because wheel oscillation provides cooler cutting.

VERSATILITY • Cuts cold rolled, stainless, and alloyed steel; cast iron; and non-ferrous metals.

ECONOMY • Occupies minimum floor space . . . eliminates annealing costs . . . gives more cuts per wheel as a result of oscillation.

SIMPLICITY • Just two SEVER-ALL cutting wheel specifications will do *all* your SEVER-ALL cutting jobs. Little or no set-up time required.

NEW SEVER-ALL AVAILABLE FROM DISTRIBUTORS

Very likely your own distributor already stocks the Model 1-A SEVER-ALL Abrasive Cutting Machine and Wheels. If not, we'll give you the name of your nearest SEVER-ALL distributor. We'll also be glad to send you complete details on this new machine. Just ask for **Bulletin DH-106.**

ALLISON-CAMPBELL DIVISION
AMERICAN CHAIN & CABLE

ACCO

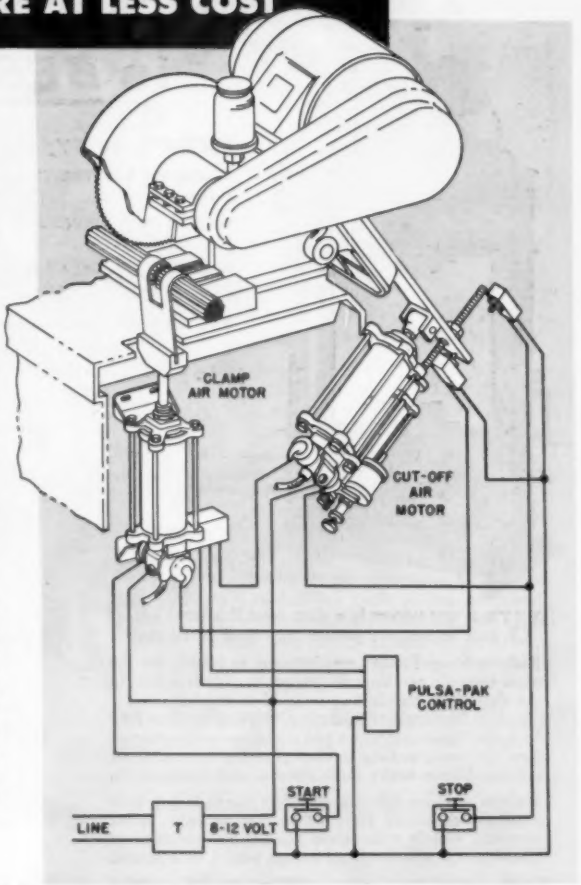
937-S Connecticut Avenue, Bridgeport 2, Conn.
Use postpaid card. Circle No. 254

HOW TO MAKE A CUT-OFF SAW PRODUCE MORE AT LESS COST

Shown at the right is a SPOT-A-MATION IDEA used in many plants. Almost invariably it has meant cost savings of 50% or more—has improved product quality, lengthened saw life, lessened worker fatigue.

Two Bellows Air Motors are used. One, hydraulically controlled, feeds the saw through the work. The second clamps the work in position. The two Air Motors are electrically interlocked. The cut-off saw can be made completely automatic by adding a third Air Motor to feed the material.

This is another typical way Bellows Air Motors are used to "Spot Modernize" existing equipment. Almost any hand fed, or hand-controlled machine can be made to produce more, at less cost, with versatile Bellows "Controlled-Air-Power" Devices.



THIS SPOT-A-MATION IDEA FILE IS YOURS ON REQUEST

Contains drawings, circuit diagrams, equipment list, and full details to enable you to convert existing equipment to lower cost operation. Write for it today. No obligation.

Address Dept. MTB-259, The Bellows Co., Akron 9, Ohio.

1285-B

OTHER INDUSTRIAL DIVISIONS OF IBEC: Sinclair-Collins Valve Co., Valvair, Akron, Ohio • V. D. Anderson Co., Cleveland, Ohio

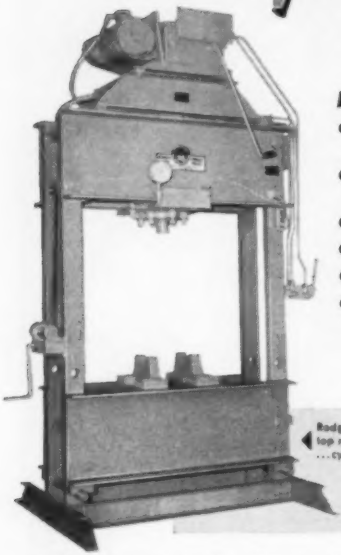
The Bellows Co.

DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

AKRON 9, OHIO

Use postpaid card. Circle No. 255

A *Rodgers* Shop Press is *BEST for YOU!*

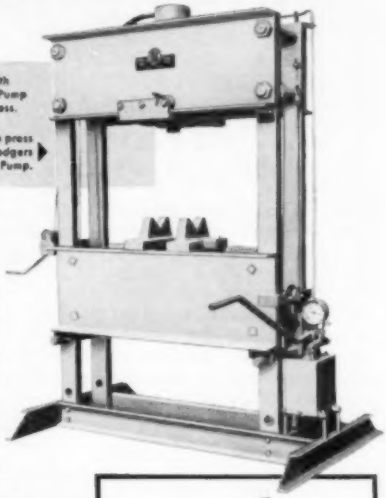


HERE'S WHY:

- **LONGEST RAM TRAVEL** with maximum hydraulic power throughout entire stroke.
- **REMOVABLE CYLINDER** for independent hydraulic power away from the press.
- **CYLINDER TRAVEL** full width of press, either way.
- **OPEN ENDS** allow long pieces to extend through sides of press.
- **EXTRA WIDE** inside work space to handle bigger jobs more easily.
- **GREATER STRENGTH** with heavy bar stock sides and pins—bearing blocks support bolster to give uniform distribution of pressure.

Rodgers 100 ton shop press with top mounted Greenlee Power Pump ...cylinder travels width of press.

Rodgers 100 ton shop press with Rodgers 2 speed Hand Pump.



WHEN YOU INVEST in a shop press it is more important to compare performance than initial cost!

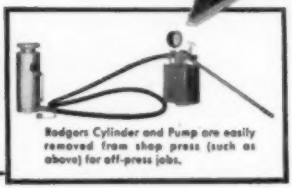
Rodgers Shop Presses are designed and built for the most versatile service, and longest trouble-free life. In the shop they handle hundreds of diversified jobs... pressing, bending, straightening, assembling. For field work the Rodgers cylinder and pump are easily removed from the press, making an ideal portable power unit for jacking, lifting, heavy shaft removal and similar work.

Rodgers produces the most complete line of shop presses available—capacities from 60 to 400 tons—in varied standard models with power pumps, top mounted or placed at the side—or hand pumps with 2 or 3 speeds.

When you compare shop press performance and cost you will find a Rodgers is best for you, too. Ask your Rodgers Representative for complete details—or write us.

SEND FOR NEW CATALOG...

It gives useful information and complete specifications.



Rodgers Cylinder and Pump are easily removed from shop press (such as above) for off-press jobs.

RODGERS HYDRAULIC, Inc.

Pioneers in High Pressure Hydraulics Since 1932

7453 WALKER STREET • MINNEAPOLIS 26, MINNESOTA

Use postpaid card. Circle No. 256

NEW LOW COST LEAD SCREW TAPPER

with...

PUSH BUTTON *operating control*

- **Produces Gauge Perfect Parts**
- **Eliminates parts spoilage, inspection**
- **Saves Taps, Reduces Fixture Costs**
- **Fast, Economical, 6-way Operation**

Here is truly the most accurate, most precise, cost-cutting tapper on the market! New, different, flexible, it can be operated with push button and foot control for cycle or jog, automatic or with switch in fixture for full cycle. Either way, it provides a *uniformity, speed* and *precision accuracy* that's unparalleled!

Here are just a few features:

- uniform threads in any pitch from 20 to 96.
- positive depth stop.
- depth stop holds uniform depth to with .005".
- tap capacity 0" to 3/16" in steel.
- lead screw travel 1-3/16".
- "safety return" stops tapping instantly.

Easy to Operate — Pays for itself!

Push button releases electrically controlled air pressure engaging sensitive friction clutch which actuates lead screw. The tap, completely controlled by lead screw, is fed gently, automatically without pressure. The result is repetitive uniformity and precision that never varies! Tests proved all tapped parts passed 100% inspection—without rejects!

Procunier

Send for FREE Brochure

giving the full story of this amazing new tapping unit. See how you can enjoy higher quality tapping, less tap breakage, parts spoilage and increase tapping efficiency—for less cost! Write today!

PROCUNIER SAFETY CHUCK CO.
14 S. Clinton St., Chicago, Ill.

PROCUNIER SAFETY CHUCK CO., Dept. 2
14 S. Clinton St., Chicago, Ill.

Gentlemen: Please rush me your FREE brochure on the new Lead Screw Tapping Attachment.

NAME_____

ADDRESS_____

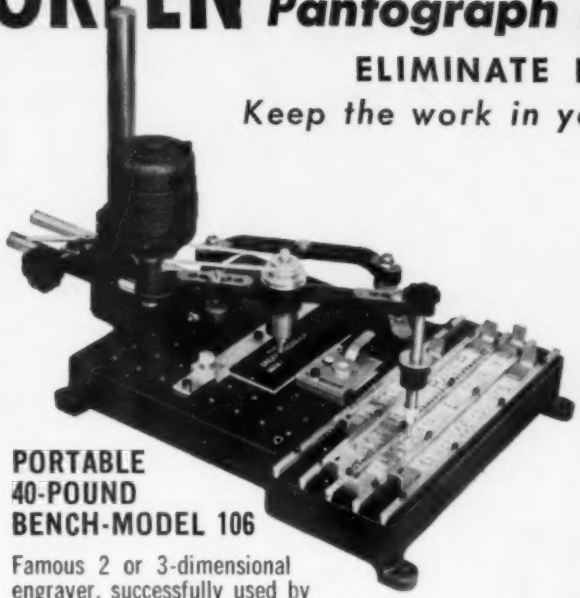
CITY_____ STATE_____

Use postpaid card. Circle No. 257

GREEN *Pantograph Engravers*

ELIMINATE DELAYS!

Keep the work in your own plant.



PORTABLE 40-POUND BENCH-MODEL 106

Famous 2 or 3-dimensional engraver, successfully used by thousands, features 5 positive, accurate pantograph ratios. Versatile ball bearing spindle has three speeds up to 14,000 rpm; height of pantograph and position of cutter are continuously adjustable; one copy carrier (supplied) accepts all standard master type sizes.

The Model 106 has proven incomparable for speed and accuracy . . . yet reasonably priced.

Cutter grinders, rotary tables, master letters, compound slides, name plates and all required accessories. For complete information, write to

MODEL D2 HEAVY-DUTY 2-DIMENSIONAL

- 575 pounds — rigid, sturdy, precise
- Vertical adjustment of copy table automatic with Pantograph
- Unobstructed on three sides to take large work
- Micrometer adjustment for depth of cut
- Ball-bearing construction throughout — super-precision ball bearing spindle
- Spindle speeds up to 26,000 rpm for engraving or machining modern materials
- Ratios 2 to 1 to infinity — master copy area 26″ x 10″
- Vertical range over 10″

GREEN INSTRUMENT COMPANY, INC.

386A PUTNAM AVENUE, CAMBRIDGE 39, MASS.

Use postpaid card. Circle No. 259

BALANCED ACTION IS BUILT INTO EVERY WINTER TAP

Four reasons why you get greater accuracy and uniformity of tapped holes:

1. EXACT FLUTE SPACING
2. UNIFORM FLUTE CONTOURS
3. PRECISION CHIP-DRIVER CONTOURS
4. ACCURATE AND CONCENTRIC CHAMFERS

WHEN TO USE

SPECIAL TAPS

Modern "exotic" alloys are typical of the wide variety of unusually hard, soft or stringy materials in use today that make your tapping operations more difficult than ever before. When it's no longer practical or possible to use conventional taps—when it's time to call in a specialist—Winter is at your service.

Winter has the experience to recommend and supply the right tap for your individual requirements. Among the many types of Winter Special Taps always available from stock are Multi Taps for aluminum, magnesium and stainless steel; Oversize Taps for plastics; Helical Fluted Taps; Nib-type Taps and Fluteless Spiral-Pointed Taps.

CALL YOUR DISTRIBUTOR for standard and special WINTER Balanced Action Taps, Dies, and Gages.

WINTER BROTHERS COMPANY, Rochester, Michigan, U.S.A. Distributors in principal cities. Branches in New York • Detroit • Chicago • Dallas • San Francisco • Los Angeles • Division of National Twist Drill & Tool Co.

Use postpaid card. Circle No. 260

YOU GET THE MOST IMPORTANT INGREDIENT FREE

Many of the competitive advantages of cost-cutting with National tools are obviously the product of fine materials, skilled workmanship, modern production equipment and processes, and long experience.

But there's another very important ingredient—one you get only in National tools. It's *on-the-job efficiency* resulting from National's continued search for better ways to cut modern metals. It's free—and it's an in-built value of every National tool you use—self-thinned twist drills, gun drills, counterbores, expansion reamers, end mills, milling cutters and other "Research Improved" tools.

CALL YOUR DISTRIBUTOR for NATIONAL twist drills, reamers, counterbores, milling cutters, end mills, hobs, carbide and special tools.

NATIONAL TWIST DRILL & TOOL

National

NATIONAL TWIST DRILL AND TOOL COMPANY, Rochester, Michigan, U.S.A. Distributors in principal cities. Branches in New York • Detroit • Chicago • Dallas • San Francisco • Los Angeles.

Use postpaid card. Circle No. 261

Features in This Issue

MACHINE AND TOOL blue book

News from Washington. Nixon will start campaigning for the presidential nomination shortly. The big question is, will he be more successful campaigning for himself than he was for other Republicans last year? President Eisenhower reveals an increased defense budget. Council says the Old Age Social Security Plan is financially sound. These and other informative articles are featured in the Washington Roundup. .....**Page 75**

Incentive Systems. Harold R. Nissley continues his discussion on industrial management problems with a dissertation on the advantages and disadvantages of an incentive system to an employer and also answers the question, "Can wage rates be changed or be the subject of arbitration under the present labor-management agreement?" Mr. Nissley points out that if a company is operating at less than 70 percent labor efficiency, a good incentive program can yield substantial cost-reduction savings. However, there are some disadvantages, and these are treated at length in this article. Mr. Nissley condenses the facts of a case that was submitted to arbitration, and warns that this case may have been decided differently by another arbiter. .....**Page 83**

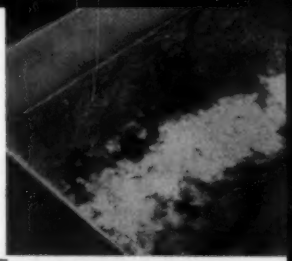
Differential Gear Case Line at Ford Sterling. The three 7-station transfer machines built by the Cross Company for machining differential gear cases at the Sterling division of Ford Motor Co. are relatively small machines compared to others in this plant. The unusual part about these transfer machines is that they are required to perform high precision work. Two diameters must be concentric within .001-in. T.I.R., and two surfaces must be square with the axis of these diameters within .002-in. T.I.R. A drilling-reaming problem was how to get a cross shaft in the center of the sphere on two planes. .....**Page 94**

Milling Operation at Homelite. The Homelite plant in Gastonia, N. Car., recently solved a problem of idle time on a $17,000 machine by employing a new set of cams plus a hydraulically operated fixture to consolidate two milling operations in one. The operation was milling two seal surfaces on the chain saw handle and housing made of die cast magnesium. ....**Page 102**

Drilling, Assembling and Staking. The Vickers Machine Tool, Inc. designed and built an automatic hydraulic drilling, assembly and staking machine for the processing of small parts at Westinghouse Electric Co. Design and operating details of the machine are presented in a feature article by Stanley E. Vickers. ....**Page 107**

Lubrication of Power Presses. The three primary areas where lubrication savings can be realized, application, selection and storage-handling are discussed by Bruce Dunham. .....**Page 118**

What's Ahead in Metallurgy? Low temperatures, higher heat and stronger, lighter metals in 1958 point to continued metallurgical advances in 1959, according to Dr. Clarence H. Loring, President, the American Society for Metals and Technical Director, Battelle Memorial Institute. .....**Page 126**



Each year, thousands of gallons of worn-out emulsions go down the drain.

With them go millions of dollars that could be saved by controlling bacteria like these Pseudomonads.

Now, ELCIDE 75 controls bacteria... prevents needless emulsion waste!

acteria shorten emulsion life. Bacteria ater soluble oil emulsions through the air, ater, and normal plant debris. They mul- ply rapidly, and cause odor, corrosion, d emulsion breakdown.

hen emulsions go sour, costs go up. The wntime loses production, and costly labor needed for the recharging and disposal of e waste emulsion. The additional soluble l required adds to the total cost.

acterial plate counts prove Elcide 75 increases nulsion life. The left plate shows the untreated nulsion. The right plate proves Elcide 75's double ntrol keeps emulsions clean and usable... as much 5½ times longer by actual plant tests.

Elcide 75 is a powerful combination of Sodium *o*-phenylphenate and Sodium Ethylmercuri Thiosalicylate (Thimerosal) . . . related to one of the safest, most effective bacterial inhibitors used in medical surgery. Its double action controls more bacterial growth than the commonly used germicides and "additives"; yet it is completely safe to employees and machinery.

Just one ounce of Elcide 75 added to each four gallons of standard duty soluble oil emulsion lengthens emulsion life, reduces soluble oil requirements, reduces downtime for recharging, decreases disposal of waste oil, preserves emulsions during extended shutdowns, lessens bacterial health hazards, and reduces bacterial corrosion of machinery and products.

If your company is not one of the many plants now using Elcide 75, we suggest you try it soon. Your own cost analysis should convince you of its value.

ELCIDE 75™

PATENT PENDING

KEEPS COOLANTS FRESH AS A DAISY!

PRICES: ELCIDE 75

(Lilly's brand of bacterial inhibitor for cutting fluids)

Package	Price per Gal.
1-gal. (4 per case), polyethylene . .	$8.50
5-gallon, polyethylene	$8.00
55-gallon, stainless steel.	$6.50

Sold only through selected distributors.

Lilly AND COMPANY • AGRICULTURAL AND INDUSTRIAL PRODUCTS DIVISION • INDIANAPOLIS 6, INDIANA

It is hard to believe it is four years since Harold R. Nissley's series of articles on time study appeared in MACHINE and TOOL BLUE BOOK. We were much impressed by the series and ordered reprints for our entire Methods and Time Study Department. We intend doing the same for the series you are starting in January, 1959.

From our standpoint, a recounting by Mr. Nissley, in his own inimitable style, of a complete "Work Simplification Programming" from introduction thru the training stage and into practical application, follow-thru, installation, and feedback stages would be very welcome.

Marion D. Doyle, Manager
Methods and Time Study
Cincinnati Milling Products Div.
Cincinnati Milling & Grinding Machines, Inc.
Cincinnati 9, Ohio

Cutter Cooling

In your October issue an article "Cooling of Cutters by Heavy Pressure Stream" appears, translated from the Russian. While we expect the Russians to make use of anything useful we do here, the block in explanation on Page 104 indicates that perhaps you are not aware that the high pressure system investigated by the Russians was invented here in 1950. Patents 2653517, 2683303, 2785457, 2716914 & 2818696 are some of them, all owned by Gulf Research & Development Co.

Gulf Research and Thompson Products carried on considerable experimental work, which was first published in a paper by the writer and A. T. Colwell, "Hi-Jet System for Increasing Tool Life," delivered at the Annual meeting, Society of Automotive Engineers, Jan. 15, 1952. Another paper "New Developments in Cutting Metal" was delivered at the Cincinnati meeting of the American Society of Mechanical Engineers on June 15, 1952. Another short article "Metal Cutting Developments" was published in the Dec., 1952 Journal of American Society Lubrication Engineers.

R.J.S. Pigott
755 Old Mill Road
Pittsburgh 38, Pa.

Ceramic Milling

Would you please advise as to where we might find more information regarding the material used in preparing ceramics and metallics used in cutting devices referenced in Mr. Horace Frommelt's article entitled, "Ceramic Milling of Ferrous Materials," published in the November, 1958 issue of MACHINE AND TOOL BLUE BOOK.

D. N. Kirkpatrick
Electronics Division
Stackpole Carbon Company
St. Marys, Pa.

with a
DI-ACRO ROD PARTER
Make several thousand burr-free cuts per hour in bar stock

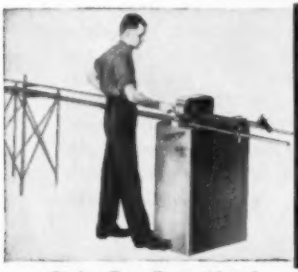
Combination shearing-breaking action parts bar stock without burring and minimum distortion. Handles up to ⅜" round bar stock—square, rectangular, and hex shaped bar stock can be parted when machine is equipped with special die heads.

Material range is from hot rolled bar stock to stainless steel and other high alloy materials. The harder the material is the better it parts.

Long lasting die heads can be reversed before resharpening—can be sharpened many times. Standard cutting heads in No. 2 and power models have 10 graduated holes from 1/16" to ⅜"; No. 1 Model has eleven holes. Optional die heads for parting scaly hot rolled bar stock *at not extra charge.*

Speed-Matic Gauge, an accessory on power model, enables machine to part off several thousand short pieces an hour. *Send us samples for test cutting or consult the Yellow Pages of your phone book for the nearest Di-Acro distributor.*

This ½" stainless steel bar stock has been "parted" in a Di-Acro Rod Parter. Shiny edges show where rod was sheared, then fractured or "parted off." Will clear hole its own diameter.



Di-Acro Power Parter with stock stand and Speed-Matic Gauge.

Hand operated model also handles up to ⅝" rods.

pronounced die-ack-ro

di-acro PRECISION METALWORKING MACHINES

O'NEIL-IRWIN MFG. CO.

314 8th Avenue, Lake City, Minn.

Use postpaid card. Circle No. 263

Meetings

Feb. 3, 4, 5—Society of Plastics Industry. Reinforced Plastics Division Conference, Edgewater Beach Hotel, Chicago, Illinois. Headquarters: 250 Park Avenue, New York 17, New York.

Mar. 6-18—Society of Automotive Engineers. National Passenger Car, Body and Materials Meeting, The Sheraton-Cadillac, Detroit, Michigan. Headquarters: 485 Lexington Avenue, New York 17, New York.

Mar. 16-18—Society of Automotive Engineers. Congress. Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles, Calif. Sponsored by the American Society for Metals. Headquarters: 7301 Euclid Avenue, Cleveland 3, Ohio.

Mar. 19, 20—Society of Automotive Engineers. National Production Meeting, The Sheraton-Cadillac, Detroit, Michigan. Headquarters: 485 Lexington Avenue, New York 17, New York.

Mar. 26, 27—Sixteenth Pacific Coast Section Conference, The Society of the Plastics Industry, Inc., Hotel Del Coronado, Coronado, Calif. Headquarters: 250 Park Avenue, New York 17, New York.

Mar. 31-Apr. 3—Society of Automotive Engineers. National Aeronautic Meeting, Aeronautic Production Forum, and Aircraft Engineering Display, Hotel Commodore, New York, New York. Headquarters: 485 Lexington Avenue, New York 17, New York.

Apr. 14, 15—Conference on Industrial Instrumentation and Control. Illinois Institute of Technology, 35 West 33rd Street, Chicago 16, Illinois.

Apr. 18-22—American Society of Tool Engineers. Schroeder Hotel, Milwaukee, Wisconsin. Headqaurters: 10700 Puritan Avenue, Detroit 38, Michigan.

Apr. 20, 21—Seventeenth Annual SPI Canadian Section Conference, The Society of the Plastics Industry (Canada), Inc., Windsor Hotel, Montreal, Canada. Headquarters: 77 York Street, Toronto, Ontario, Canada.

LOOK!

LOGAN HAS IT!

RIGHT PRICE

TOP QUALITY

PEAK PERFORMANCE

in hydraulic power devices

LOGANSPORT MACHINE CO., INC.
803 CENTER AVENUE, LOGANSPORT, INDIANA

PLEASE SEND COPY OF CATALOG:

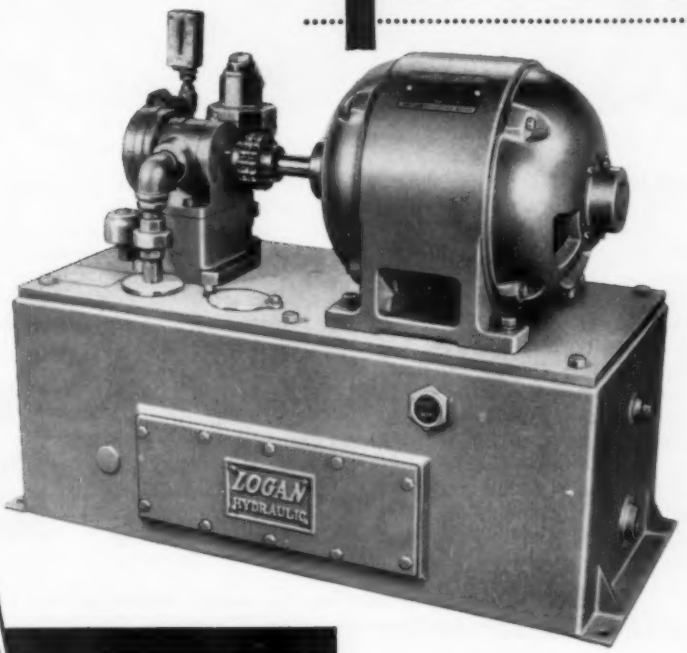
- ☐ 100-1 AIR CYLINDERS
- ☐ 100-2 MILL-TYPE AIR CYLS.
- ☐ 100-3 AIR-DRAULIC CYLS.
- ☐ 100-4 AIR VALVES
- ☐ 100-5 LOGANSQUARE CYLINDERS
- ☐ 100-6 ULTRAMATION CYLINDERS
- ☐ 200-2 PRESSES
- ☐ FACTS OF LIFE
- ☐ 200-1 HYD. POWER UNITS
- ☐ 200-2 ROTOCAST HYD. CYLS.
- ☐ 200-3 750 SERIES HYD. CYLS.
- ☐ 200-4 AND 200-7 HYD. VALVES
- ☐ 200-6 SUPER-MATIC CYLS.
- ☐ 300-1 CHUCKS
- ☐ ABC BOOKLET
- ☐ CIRCUIT RIDER

TO:

NAME_____ TITLE_____

COMPANY _____

ADDRESS _____



FREE **SEND FOR YOUR COPY OF THE LOGAN "CIRCUIT RIDER"**

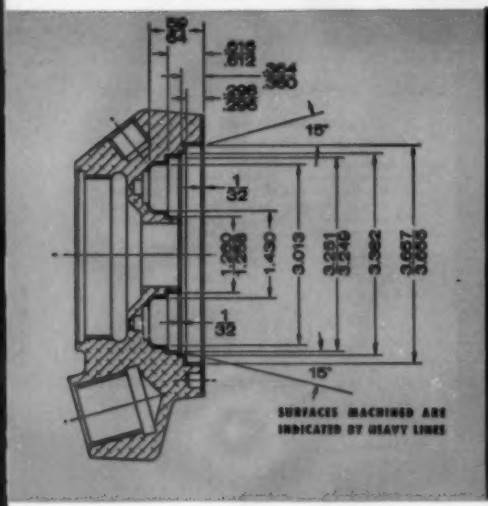
A 32-page manual on fluid power circuits (fifth edition) completely revised to present current engineering trends.

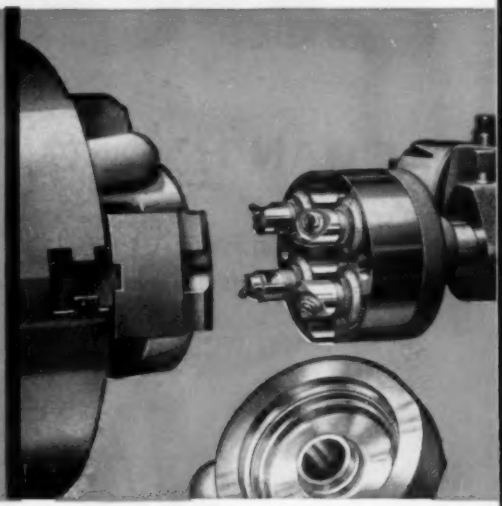
MEMBERS: Natl. Mach. Tool Builders' Assn.; Natl. Fluid Power Assn.

ILLUSTRATED—LOGAN MODEL 6031 HYDRAULIC POWER UNIT

Use postpaid card. Circle No. 264

13 surfaces finish machined in 2 passes...





HERE'S HOW MICROBORE CLUSTER TOOLING DOES IT ON A TURRET LATHE!

This Special Microbore Production Tooling was designed for a well known hydraulic pump manufacturer to machine pump covers on a turret lathe. Operations include precision boring and turning thirteen diameters and faces in only two passes. Think of the costly manhours saved and down time eliminated in comparison with conventional, piecemeal methods of handling this same job.

ACCURACY IS AN ECONOMY—With the Microbore System of cluster tooling, independent precision adjustment of each Microbore tool point permits accurate settings in a matter of seconds. On piece after piece, machined surfaces are held to extremely fine limits.

Microbore is a versatile tool that can be applied singly or in clusters for all types of boring, turning and facing operations. Microbore also manufactures Standard Boring Bars, Boring Bar Sets and Microbore Flash-Change Tooling—the ultimate for quick change tooling.

Join the leaders who are already multiplying their profits with modern Microbore tooling and methods. Write for Catalog No. 58.

DeVlieg Microbore System

DE VLIEG MICROBORE • DIVISION OF DE VLIEG MACHINE COMPANY

Fair Street • Royal Oak, Michigan

Use postpaid card. Circle No. 265

I am disappointed at the lack of emphasis placed on some programs. We should be going farther faster in our military preparations and in our space program. The Administration has failed to give enough consideration to the repercussions of the Soviet moon rocket. They are programming as if we were living in a static world rather than an exploding and developing world.

Senate Majority Leader Johnson (D., Texas)

Will Nixon Campaign More Successfully for Himself Than for Fellow GOPers?

While Vice-President Nixon seems to be an easy favorite among Republicans for the party's presidential nomination in 1960 and is acknowledged to be highly qualified for the job, the greatest danger to his political career is said to be his apparent difficulty in swaying voters.

Political analysts have pointed out how this weakness was demonstrated recently in Alaska. Even though Nixon campaigned earnestly for Republican candidates, the voters, in every case, elected Democrats to office. In the November 4 national election as well, his campaigning for numerous candidates failed to stem the tide of votes cast for the oppositon. If Nixon is nominated, it will be because the delegates believe him to be more adept at getting votes for himself than he has proved to be in getting them for his fellow Republicans.

The analysts admit, however, that even President Eisenhower's campaigning for Republican candidates was of little assistance except in 1952 and 1956, when his name was on the ballot.

President Reveals Increased Defense Budget

At a recent White House conference, President Eiesenhower told Congressional leaders of both parties that defense spending in the

continued

fiscal year starting next July will be budgeted at $40.9 billion—up $100 million from the present fiscal year.

At the close of the meeting, several Democrats who were present criticized the new budget as being inadequate in light of the Soviet's latest venture into space. This criticism may indicate a reversal in Democratic political strategy. Since the President's balanced budget announcement, Democrats generally have been careful to avoid charges of reckless spending. Judging from their comments concerning the new defense budget, it is clear that they consider the new Russian rocket to be sufficient reason for an attack on the Administration's space plans.

Actual defense appropriations for 1959-60 may exceed Administration budget recommendations by from $1.5 to $3 billion. Urged on by the chairmen of Senate and House appropriations subcommittees, Secretary McElroy is expected to fight for what he needs, but the President is sure to try to hold defense increases to a minimum.

Council Says OASI Plan Is Financially Sound

A 14-month study by the 12 members of the Advisory Council on Social Security Financing—made up of three employer representatives, three employee representatives, and six representatives of the general public and the self-employed—has served to silence rumors of social security system insolvency. The fund has been alleged to be showing a net loss and the program to be financially weak because payments for the past two years have exceeded receipts.

The Advisory council has unanimously declared the nation's social security system to be "financially sound," and added that "the contribution schedule now in the law makes adequate provision for meeting both short-range and long-range costs. Their method of financing is sound and . . . no fundamental changes are required or desirable."

About 12½ million people now are drawing monthly benefits under the Old Age, Survivors and Disability Insurance program, according to the findings of the Council.

• • •

America can afford the cost of security. Concrete action to buttress our entire economic structure is mandatory on the new Congress. Neither the threat of Communist expansion nor the weaknesses in the domestic economy are insurmountable. Both can be met by determined action, confidence in the future of our democratic structure, and courage.

AFL-CIO President George Meany

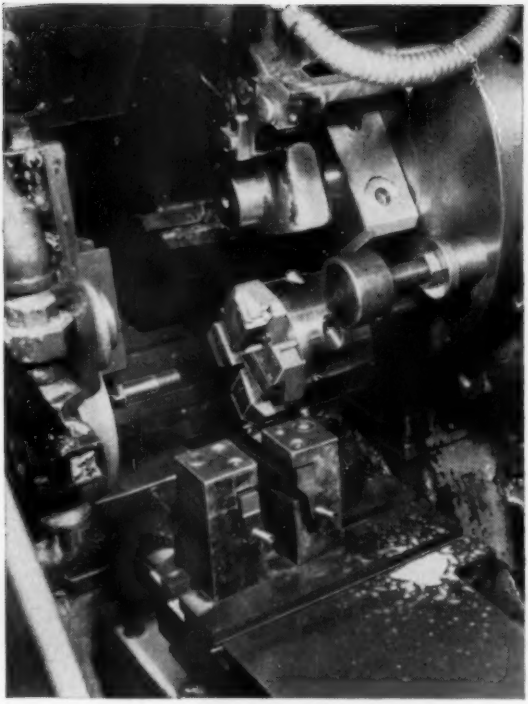
AUTOMATIC

THREADING

to close tolerances on

SINGLE-SPINDLE

automatic



Automatic opening and closing and ability to meet exacting concentricity requirements were the principal reasons a LANDIS Die Head was selected to thread drive wheel cap screws at the Yale Materials Handling Div. of The Yale and Towne Mfg. Co. in Philadelphia, Pa.

A standard FD LANDMATIC Head arranged for automatic closing is used on a Cleveland Single-Spindle Screw Machine to thread 3140 steel. A special over-travel feature eliminates the necessity of complicated, accurately-set closing cams. Threads meet Class 3 tolerances and are concentric with the screw body within .002"—with 400 pieces completed between chaser grinds.

For range and other features of LANDMATIC Heads, ask for Bulletins F-80 and F-90.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA 480

Use postpaid card. Circle No. 266

New accomplishment in automation with new Logamatic 410

automated turret lathe with air-hydraulic cross slides

Only the Logan Logamatic 410 offers so many features in its price range! Swing over bed, 14⅝". Swing over cross slide, 6⅞". Spindle bearings: (4) ABEC Class 7. Speed range, 25 to 2,000 rpm. Two-speed, 3—1½ hp. Dinabrake motor and controls are standard equipment.

$8,800.00*

*F.O.B. factory, including motor and controls complete, less 8" power chuck accessory. Price subject to change.

- Electric power-turret feed
- Automatic cycling
- Adjustable rapid travel
- Variable-rate turret feed
- Variable-rate cross slide feed
- Variable-speed drive
- Pushbutton control
- Available as bar-feed machine
- L-0 spindle nose

LOGAN ENGINEERING CO. Dept. H-259, 4901 Lawrence Ave., Chicago 30, Illinois

Use postpaid card. Circle No. 267

A Little Knowledge Can Be Dangerous

We've often admired what an enterprising manufacturer or design engineer can do with various components to improve the performance of a standard machine tool.

When a manufacturer can equip a lathe with air and hydraulic cylinders, micro-switches and a magazine feed so that it does the job of an expensive lathe, this is commendable. But when management, faced with a cost reduction mandate, goes hog wild on a "do-it-yourself" binge, that's another thing.

The guiding principle should be this: any engineering job should be the responsibility of the people that know how to do it. Nothing has occurred in the industrial picture to change the old axiom that "a little knowledge can be dangerous." The Xnay Company, let us say, has been buying a whole unit from the Able Company for years. The unit required design, manufacturing and maintenance. Faced with the problem of keeping costs down, Xnay decides to build the unit themselves. Some of the parts will be procured from Able and installed by Xnay's machine shop in a similar unit. There's nothing wrong with this decision if the Xnay Company personnel has the know-how to do all the "little things" or the one little thing required to do a first-class job of machine building. If the "first class job" doesn't materialize, however, there is a strong tendency to put the blame for inferior performance on the wrong party.

To be more specific, let's consider the situation of the gagemaker, because it is in this field where some of the more glaring examples occur.

The ABC Company, for years, has been entrusted with the design, manufacture, calibration, installation, and maintenance of the production gages and gaging machines for several companies. Comes a recession and these companies are customers only for the instrumentation made by ABC, which is incorporated into the manufacture of the gaging machines by the company's respective toolrooms. In some instances the design and building of the gaging equipment is let to an outside source at a lower price than ABC quotes.

Sometimes the above method works; sometimes it doesn't. In the latter case, ABC's instrumentation is recognizable, so ABC is the innocent victim of misdirected responsibility. ABC is placed in the awkward position of being unable to say anything, because, after all, management issued the "do-it-yourself" order; the designers and outside toolmakers represent potential business, the chief inspectors approved the design and the purchasing department concurred.

PAUL A. MELINE
Managing Editor

Precision Tool News

NO. 9 B·S REPORTING NEW DEVELOPMENTS AT BROWN & SHARPE'S PRECISION CENTER

B&S traveling exhibit shows newest tools right at plants . . . welcomes invitations

The B&S "Mobile Precision Center" shows Brown & Sharpe tools to interested personnel at plants throughout the country. It operates on the theory that no one can fully appreciate the excellence of design and ease of usage of a new tool until he's held and used it in his own hands. Tool users agree; in 1958 the B&S truck visited 1000 plants in 48 states, with over 25,000 people attending.

Booklet summarizes features of new B&S tools introduced during 1958

Brown & Sharpe's 20-page booklet entitled "New Precision Tools" is of interest to anyone concerned with tooling or metalworking production. It describes and illustrates all of the latest tools introduced by this company. Improvements in accuracy; savings in time and money; and easy-handling characteristics are spelled out so that the reader can tell what each new tool has to offer him in his own operations. The booklet is available for the asking from your distributor or from Brown & Sharpe Mfg. Co., Providence, R. I.

A few of the latest tools described in Brown & Sharpe's new booklet:

- Convertible Thimble Micrometer provides "friction" or fixed thimble at will.
- Greatly expanded line of "Black Frame" Micrometers offers higher quality at lower prices.
- Hite-Icators and Riser Blocks measure any desired height, quickly, easily, accurately.
- Self-contained, transistorized 36″ electronic Super Hite-Chek reads in .000025″.
- 8″ Vernier Height Gage takes small measurements accurately . . . costs less.
- Complete line of simple and compound sine tools, permanent magnet and inspection types, bring accuracy and speed to angular measurements.
- New, lower, permanent magnet chucks hold better . . . provide greater work clearance.
- Dial Bore Gages and Setting Devices — cover greatest range at lowest cost.
- "Ready Mark" Ground Flat Stock comes pre-colored with non-cracking finish, ready for scribing. Oil-and air-hardening types.

The Mobile Precision Center welcomes an invitation to visit your plant during 1959. Requests should be made as early as possible in the year, through your Brown & Sharpe distributor. All tools exhibited are available to you from his stock — quickly, and economically. Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

Brown & Sharpe

INDUSTRIAL PRODUCTS DIVISION

PRECISION TOOLS AND GAGES
SCREW MACHINE TOOLS
SHOP ACCESSORIES

PROGRESS IN PRECISION FOR OVER 125 YEARS

INDUSTRIAL DISTRIBUTORS — SERVING INDUSTRY ECONOMICALLY — THE RIGHT HAND OF PRODUCTION

PRECISION TOOLS AND GAGES • MILLING, GRINDING AND SCREW MACHINES • CUTTERS • MACHINE TOOL ACCESSORIES • PUMPS AND HYDRAULIC VALVES

Use postpaid card. Circle No. 268

NEW LEADED STEELS FROM RYERSON

Now! Faster machining with . . .

LEDLOY 170 TUBING
average machining speed
170 surface feet per minute

Here's the fastest-machining steel tubing ever produced—and only Ryerson has it available for immediate shipment from stock. Sizes range from 1″ to 2½″ O.D. with maximum ⅛″ wall thickness. Other sizes can be supplied promptly.

LEDLOY 375 BARS
average machining speed
375 surface feet per minute

This newest addition to Ryerson free-machining screw steel stocks is the world's fastest-machining steel. It rates about 64% higher than B-1113 and about 20% higher than Ledloy 300.

Ledloy 375 bars presently in Ryerson stocks include rounds in sizes from ¼″ to 1″, hexagons ¼″ to ⅝″.

Ask your Ryerson representative for complete details on these new steels. And call Ryerson for an unequaled selection of cold finished bars and tubing.

MACHINING COMPARISON*
Ledloy 170 Tubing vs. Nonleaded Tubing

	Ledloy 170		MT-1015	
	Speeds	Feeds	Speeds	Feeds
Center drill	172 s.f.m.	.005″	110 s.f.m.	.005″
Form tool	172 s.f.m.	.0008″	110 s.f.m.	.0008″
Boring tool	172 s.f.m.	.007″	110 s.f.m.	.007″
Cutoff	172 s.f.m.	.0013″	110 s.f.m.	.0013″
Thread	27 s.f.m.	—	20 s.f.m.	—
Tap	18 s.f.m.	—	12 s.f.m.	—
Production time	35 seconds		49 seconds	

*As demonstrated at National Metal Show, Cleveland, 1958

RYERSON STEEL
Member of the INLAND Steel Family

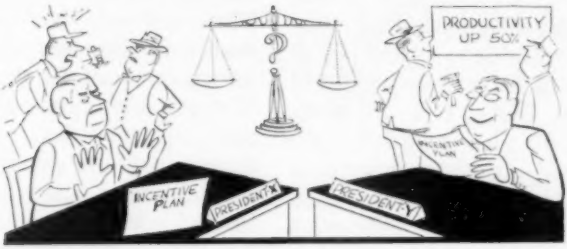
Principal products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing —aluminum, industrial plastics, metalworking machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK · BOSTON · WALLINGFORD, CONN. · PHILADELPHIA CHARLOTTE · CINCINNATI · CLEVELAND · DETROIT · PITTSBURGH · BUFFALO · INDIANAPOLIS · CHICAGO · MILWAUKEE ST. LOUIS · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

Use postpaid card. Circle No. 269

MACHINE AND TOOL
blue book
FEBRUARY, 1959

Practical Arbitration, Time Study and Work Simplification



PART II—What are the advantages and disadvantages of an incentive system to an employer?

By **Harold R. Nissley**
Professional Engineer

If a company is operating at something less than 70% labor efficiency, then a good incentive program can yield substantial cost-reduction savings. But these savings are not achieved without some off-setting hard work and expenses e.g. a good industrial engineering staff. And seldom can an incentive program thrive in poor labor-relations soil. Under the right conditions a good incentive plan should increase your productivity from 30% to 50%; it should stimulate cost-reduction thinking; it should control your costs better than a typical day-work plan. But a good incentive plan costs money to set up.

• Two company presidents are comparing notes about their labor problems. *President X says*: "If anyone ever tries to sell me another incentive plan, I'll shoot him. Since we installed our present plan six years ago we have spent more time arguing about piece rates than we spend in getting out production."

President Y replies: "If we had not installed our incentive plan two years ago we would be out of business today. Since we installed our plan our productivity has increased 50%. We had an amusing incident happen to us last week. One of our strongest competitors came to us and tried to convince us that we were selling

our product below cost. I told him that if he were willing to bring his cost figures to us, we would bring ours out and compare notes. It finally developed that because of their day-work incentive plan their cost figures varied so widely from month to month that they could only produce over-all average figures which in no way reflected future item costs. His day-work wage payment plan gave him very little control of his individual product cost; our incentive plan is set up so that our estimators can forecast, within 5%, what a production run will cost us."

President X says: "Well, I guess we should have put in our own incentive plan instead of calling in a firm of consulting engineers who sold us the most complicated plan you can imagine. Not only do we spend time in trying to explain many things (which we really don't believe ourselves) but our clerical costs for administering our payroll has doubled since we adopted the plan six years ago. Thus we are stuck with a plan that was supposed to reduce our direct and indirect costs but which has actually increased them. So many of our rates are out of line that some of our people are making more money than their departmental supervisors. And when we try to apply remedial action by tightening future work standards we spend hours in grievance meetings and usually end up by caving in 90% of the way. Of course *we* can't grieve against the union on our wild rates."[1]

[1]Here is what the consulting engineer who installed this incentive plan might tell you: "Yes, I committed a few blunders on this job. But most of my mistakes could be chalked up to my failure to stick to my guns instead of cooperating 100% with the client. For example, I wanted to remain on this job for at least a month after I had worked up some of the standard data and had sold the plan to the union. I was especially anxious that this be done because of the man the company had selected to administer the standards and incentive program. My choice for this important post was the general foreman, who most of the qualities of a good standards man (common sense, integrity, and personality, to name but a few); but the works manager could not spare him. However, it was easy for the works manager to suggest to the president that the president's son-in-law should have this important experience to round out his company training. So the son-in-law (who was doing a miserable job out in the sales field) was groomed for this job two weeks before I left. During these two weeks I learned that this young fellow, although smart, became careless with the truth

President Y: "Well we toyed the idea of calling in a consulting engineer but we finally decided to do the job ourselves. However, we knew we were dealing with dynamite. Within our own organization the only man that we felt could put this new incentive plan over was our chief engineer; and he was tied up with developmental and design projects to such an extent that we could not release him; moreover, we would have had to send him to school to pick up some of these modern work measurement techniques which he did not get as a mechanical engineer during his engineering training days. So we hired a man from the outside; but we had to pay him more than we at first figured (as much as our chief engineer). We could have hired a man for much less; in fact there were two men who were extremely anxious for the job and who would have come to us for a fraction of what we paid this man. However, one of these two men was 50 years old (5 years beyond our age limit); and the other one had only a 4-year high school education although most of his other qualifications were very good.[2]

Which is better—the good experienced shop man, or the college graduate with little shop experience?

whenever he was sure he could get away with it. He wore his Ivy League education on his cuff so much that most of the shop people (including the foremen) either disliked him or would not go out of their way to help him. And this young man was to become president of this company within seven years!"

[2]This raises an old question: Who is better qualified for a work measurement job, a good shop man who knows machine speeds and feeds and can talk the language of the shop men but who has not gone beyond his high school diploma, or a college graduate (business administration or engineering) with very little shop experience? A good answer to this question would have to be an "if" answer. In a particular situation, if the reason why a shop man has not gone beyond his high school education is successive economic adversities (*e.g.*, he was orphaned at an early age and had to raise himself and help support his family). Such a man might be worth spending some time and money on grooming

"However, bringing in this high-priced man from the outside has created another problem for us. He has done a beautiful job in setting up our incentive plan. He has trained a young fellow in many of the details of the plan so well that we really don't need this expensive chief industrial engineer any longer. He is paying on a $40,000 home which he bought shortly after he came with us. He belongs to the same country club I belong to. He is the big wheel in the same lodge I like to attend. This year he was elected District Vice-President of the American Institute of Industrial Engineers which is a two-year office. So, although our incentive plan is working smoothly and despite the fact that it has cut our costs in half, we still have problems."

This hypothetical dialogue between two company presidents (based on the writer's own observations as a consulting engineer) indicate some of the problems involved in making a decision on (a) "Should we continue our present (day-work) wage plan?" or (b) "Should we experiment with one of the many incentive plans that have been developed during the past 50 years?"

Boiled down and highly simplified here are the pros and cons of an incentive plan to an employer:

1. Advantages of an Incentive Plan

Industry-wide surveys during the past 20 years indicate several advantages to users of incentive plans. But these advantages must be viewed in the light of certain qualifying conditions which were present or were introduced at the time a particular incentive plan was adopted. Some of these conditions were hinted at in the foregoing discussion of the two company presidents.

Generally, a good work measure-

for a standards job (assuming he had the other qualifications for a time study engineer). But the typical non-college shop man needs to go through one or two arbitrations with some of the larger unions to realize what he is up against when a major union takes an incentive case to arbitration. Indeed, some unions have become so sophisticated in most shop and business matters than an incentive engineer may even be judged, in part, by the English he uses! However, as indicated in the earlier footnote, if a college graduate does not have suitable personality and character traits, his education will not enable him to get his ideas across and into action. To be sure, personality can be developed but fundamentals of character do not change much after the age of 20 in most people.

ment program must precede or parallel a sound incentive plan. Unless the way has been paved by honest and intelligent salesmanship, even the best incentive plan will have rough going. A plan must be tailored to fit local needs. Finally, a successful incentive plan depends largely on the care and zeal in maintaining the plan during its operation.[3]

A good incentive plan should (and usually does) increase productivity.

An incentive plan, in effect, puts an operator in business for himself. He usually works hard regardless of whether anyone is watching him or checking on him. Indeed, a good incentive plan may be called a silent or absent monitor which continues, without interruption, to work for a company during a full eight hours. Thus, some companies report as much as 100% increase in productivity after an incentive plan has been introduced; an average increase, industry-wide, is in the 30% to 50% range.

Along with this increase in productivity come a number of plus values. Obviously, unit labor costs are reduced. But more important, perhaps, is the reduction in unit factory burden costs.

A good incentive plan should increase productivity.

Example: Assume a day-work or base pay on a particular job of $1.50 an hour. Suppose the average hourly output on this job is 150 units (under day-work pay); the direct labor unit cost is 1¢. Assume a factory burden safe of 3:1 (*i.e.*, the factory overhead is three times the direct labor costs). Thus the total unit cost of this item under

[3]Most companies recognize the need for maintaining the zeal and quality of a good sales program. But many of these same companies do not realize that, in a sense, machine operators are customers whether they are working under a day-work plan or an incentive plan. Unless these "customers" are constantly sold, "complaints" (grievances or slow-downs) are apt to become commonplace. Somewhat naively some company executives believe that just because they pay good wages to their employees they are going to get high production in return; this seldom happens even among the highly ethical employees—unless leadership and other non-financial incentives are supplied in proper amounts.

the day-work plan is 4¢ (1¢ for direct labor and 3¢ for burden).

Now suppose we introduce an incentive plan which increases our production 50% per man-hour; so instead of getting 150 units per hour we now get 225 units per hour (over an 8 hour day). But to get this 50% increase we have been liberal and held out a 33% "bait"; in other words we are paying $2.00 an hour to get 225 units which brings our unit labor costs down from 1¢ to 0.89¢ —a reduction of 11%.

Will the factory burden per unit be reduced by 11%? When it is remembered what makes up factory burden (insurance, obsolescence, salaries of supervisors and inspectors, etc., etc.), then it is easy to imagine that unit factory burden costs will be reduced by an amount far greater than 11%. Indeed, the new factory burden will be close to 33% less *per unit output* than under the old day work plan; hence the new unit cost of this product is close to 2.89¢ (instead of 4¢—a reduction of 28%!)

A good incentive plan can and should stimulate cost-reduction thinking.

Although the typical time study observer seldom capitalizes on his "front-line observation post" to suggest job improvements in his time study summary, his time study sheet should, nonetheless, have detailed job information that will enable another engineer or a supervisor to initiate a job design program. Indeed, a well-written time study summary can and is the source of many methods improvements.[4]

A good incentive plan can and should control costs better than a typical day-work plan.

It is surprising how much work any of us can do when we have the urge to work harder or more consistently (either because of positive or negative incentives). Because of the wide and frequently arbitrary work requirements in the typical day-work shop, operators do not extend themselves, consistently, day in and day out. The

[4]Most of the pre-determined (tabular) time or work-measurement consultants have changed their emphasis in recent years. Ten to 20 years ago these predetermined time consultants stressed the accuracy of their particular systems in setting fair work standards (without a stop watch or without the troublesome rating factor). Now, however, these consultants emphasize the job design possibilities of their systems. One of these consultants stimulates job design thinking by asking supervisors (when they are selling a supervisor a work standard) such questions as: "Do you want to pay 0.0820 minutes for this element or 0.0610 minutes?" Of course, to get the element for 0.0610 minutes, the supervisor will have to change his job design. *Note*: The decision to change an old design rests with the supervisor in this instance—not with the "expert."

result is unit costs vary widely from one period to another and from one production run to another or from one product to another. This incentive-plan advantage over the day-work plan diminishes, of course, where measurement is introduced into a day-work plan (*e.g.*, measured day work plan): usually, however, work measurement in day work wage payment plans is not done with the same care and precision that is used in typical piece work plans.[5]

2. Disadvantages of an Incentive Plan

Judging from the foregoing it would seem that all the evidence favors the good incentive plan. But a good incentive plan does not have everything in its favor. Here, then, are the limitations and disadvantages of an incentive plan:

The cost of setting up a sound incentive program is higher than the cost of setting up a non-measured day-work plan.

If work measurement is to be the basis of an incentive plan, then the cost of setting it up will be greater by an amount at least equal to the cost of the work measurement program. And work measurement, if done accurately and properly, does not come cheap—regardless of who does it. It is unfortunate that most companies do not capitalize on this expensive research tool by insisting that it do triple duty: (a) time job elements for a particular job; (b) establish the basis for future standard data; and (c) incorporate specific suggestions for improving the job being time studied. Thus the cost of one job standard involving, say, an 8 hour time study of the job might cost the company

You capitalize on a work measurement program when you make it do triple duty.

$100 ($25 for the day of the time study observation; $25 for the time of the observer in writing the job up and making his calculations; $25 for the time of the supervisor

[5]Indeed, until a company has allowed the full free play of selfish initiative to operate within its labor force under a wide and open incentive plan, it seldom knows just what its labor force is capable of producing. During the writer's 16 years of consulting practice with very large and very small companies some fantastic production notions have been dissipated.

and the chief time study engineer in consultation; and $25 for other indirect costs).

The cost of administering an incentive plan is usually greater than the cost of administering a day work plan.

A man's purse is, perhaps, the most delicate part of his body. So anything that constantly affects a man's purse requires more complicated and more delicate tools than is the case where a man's pay envelope does not change from one pay period to another.

Let us assume a sound incentive plan has been developed. Let us assume that it has been "sold" to the union and to the rank and file. It remains sold only as long as it yields, quickly, the results expected of it; in the case of the operator this means more take-home pay. If this greater pay is a function of more units turned out by the operator, then an accurate count (and check) must be made of these units. In the case of the standard-hour plan, this count must be multiplied by the equivalent decimal hour per unit to get the total earned hours of the operator. This figure of total earned hours must then be multiplied by the operator's base rate to calculate his total earnings. Thus it is not hard to see where a company of 500 employees could keep an extra payroll clerk busy most of the time just figuring individual pay checks under a typical incentive system in a job shop operation where an operator averages from 15 to 30 jobs per pay period (hence 15 to 30 different calculations per operator). To complicate the matter further many incentive plans are superimposed onto war-time wage structures so that the final wage calculation of an operator may involve even more.

Under such a mountain of calculations a payroll clerk is bound to make an occasional mistake. And for every mistake made, the company loses at least one-man hour of direct and indirect labor (the time of the grievant operator; the time of his supervisor; the time of the payroll department; and, frequently, the time of the union steward).

Supervision becomes lax whenever an incentive plan is introduced.

Prior to the introduction of an incentive plan production pressures have usually been so great on supervisors that the typical supervisor heaves a sigh of relief; he readily accepts the idea that work measurement and p r o d u c t i o n quotas are outside his province—a sort of hot potato that anyone is welcome to have. Thus the industrial engineer is apt to find himself in one corner of a four-corner ring; one corner of this ring is occupied by the operator; another corner by the foreman.

Can wage rates be changed or be the subject of arbitration under the present labor-management agreement?

How Would You Arbitrate this Case?

One of the rights which companies are reluctant to give up (understandably so) is the establishment of wage rates. The reason for this becomes apparent when the reader recalls the large sum annually paid out by a company in wages. Moreover, days, weeks, and months are frequently spent in bargaining over a few cents per hour. How, therefore, could a company justify risking all of this work on one turn of an "arbitration wheel"? For this reason wages and wage rates are excluded from arbitration in many labor-management contracts.

Not withstanding this strong feeling against arbitrating such an important matter a company may choose arbitration to other worse evils (*e.g.*, a strike, a slow down, ad infinitum[8]).

Although it is generally true that companies do not arbitrate wages or wage rates, there are enough exceptions to make individual cases worth looking into.

When an impartial umpire or arbiter is asked to rule on an industrial dispute he is or should be guided by specific directives (and not by his whims or even industry practice). These direc-

---

(*Author's Note:* One of the important phases of arbitration is the selection of a good arbiter. Indeed, the hand-picking of an arbiter by the parties is one of the advantages of arbitration compared with long and costly court action where the parties take their chances with the precise judge who will hear a case. To aid parties in the selection of an arbiter at least one organization has set itself up as an arbitration forecaster: For a fee, this organization will evaluate your chances of winning a case with a particular arbiter on a particular issue. This is a big claim when it is remembered that less than 10% of arbitration decisions are openly published; but access to trade association and/or union files where thousands of decisions are reproduced could lend some credance to this claim. However, as long as BLUE BOOK reader interest holds up on arbitration matters, the reader will not have to resort to any such secret investigation to get *my* views on specific arbitration issues (with particular histories and backgrounds). The following case is one of a series of cases which the writer will report on. This case is somewhat condensed from the original case; but there are, it is hoped, enough details given so that the reader understands the arguments.

tives, in the order of their significance are:

1. The *issue* which is usually written out for the arbiter and is jointly signed by the parties. The issue is frequently a rewording of the original grievance.
2. The *contract* which includes all parts of the contract unless the issue specifically restricts the arbiter to a portion of the contract.
3. Written agreements or understandings which came after the contract. Such agreements, when in conflict with the original contract, have the effect of saying: "We changed our minds about Section IV; we now want this to mean _____."
4. The original grievance statement itself. This is merely an important exhibit or bit of evidence. It is used by the arbiter only if there is some conflict of meaning in the first three items just mentioned. Or, if the parties come to the arbitration without a clear understanding or written statement of the issue, then the arbiter may use the original grievance statement as a starting point in getting the parties to agree upon the precise wording of the issue

[1]Included in this "ad infinitum" are such tactics as "throwing prestige spit balls." This is illustrated by the following true incident. The president of a company in a highly civic-minded community accepted the general chairmanship of the Red Feather Drive. His enthusiasm and public spirit prompted him to reach out for the captaincy of the Industry Section. The year before when he was not active in the Red Feather Drive he had managed to get 100% participation in his own plant; he started out to do this in all factories in the community as Captain of the Industry Section. Imagine his chagrin when, after turning down his union on an arbitration proposal, the word went out: "Don't give anything to Red Feather at the plant; give your contribution to your church, to the school, or to the house-to-house canvasser." Thus this president ended his campaign with less than 20% of his people (including office personnel) participating through the company in its Red Feather Drive. The writer, of course, is not suggesting that company executives should compromise broad and deep principles of business conduct for personal pride; but an executive should know the price he may have to pay on a matter before he takes a definite stand; and the loss of some civic prestige may be one price. If the principle is deep enough, full glory to the executive who stands his ground.

which they wish him to decide. But once the issue is decided, the arbiter is bound, primarily to it—and not to the grievance statement.

The company in the case under discussion was very reluctant to take this case to arbitration. So reluctant was it that the company counsel pointed his finger at the writer (the arbiter) and said; "Mr. Nissely, if you decide this an arbitable matter, we are going to take your decision to court and have it set aside!"

Here are the pertinent contract clauses which each side presented. The union claimed relief because of this section of the labor-management agreement:

> "The Company will prescribe or set and correctly maintain for each operation the minimum production requirement and the base rate shall be paid for this minimum production requirement. If any employee's production is more than his minimum production requirement, the employee shall be paid in exact ratio to the increase above the minimum production requirement. If, after a thirty-day (30) period of application, the employee doubts the reasonableness of any of the minimum production requirements set by the Company such rates or production requirements shall be open to the grievance procedure. Continued failure of the employee to produce the minimum production requirement(s) is considered cause for discipline or reassignment unless his failure is due to causes beyond his control."

In addition to citing several previous arbitration awards on the matter of wage rates (all awards so cited were opposed to such changes), the Company cited its own contract:

> "Established piece work rates shall not be revised without the mutual consent of both company and union."

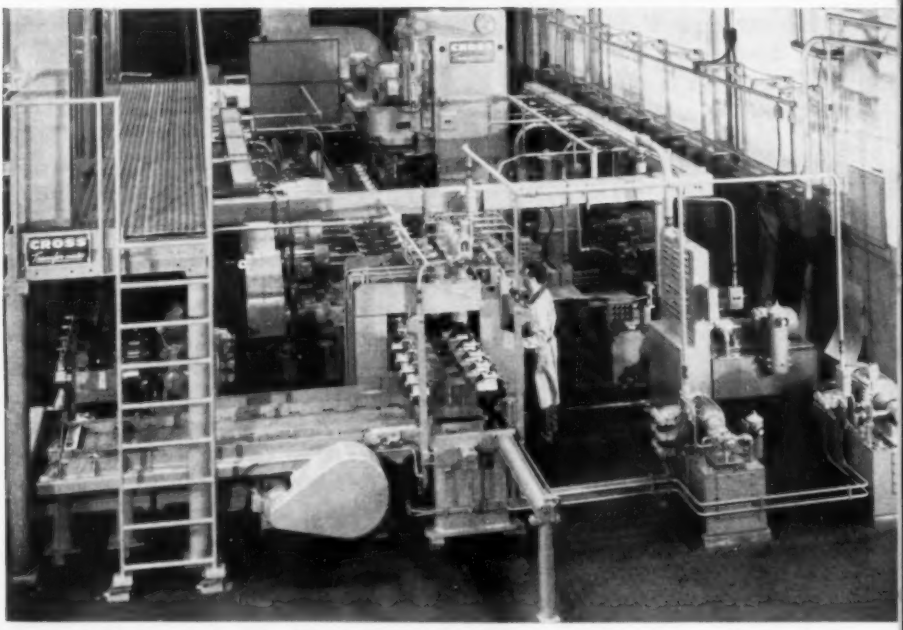
Because the company felt strongly that piece work rates could only be settled intelligently by the parties themselves—not by an outsider—the company would never give its consent to arbitrating piece work rates. Thus there can be no basis for such an arbitration because mutual consent would be lacking.

Moreover, the company claimed relief from the clause quoted by the union. The company said there was an error in the wording of the contract and all previous rate disputes recognized this error. The error alluded to refers to the section which reads: ". . . If, *after* a thirty-day period of application, the employee doubts the reasonableness of any of the minimum production requirements set by the Company . . ." When the contract was negotiated the parties discussed and agreed that all piece rate grievances shall be initiated *within* or *before* (not *after*) 30 days of trial.

We are withholding the Arbiter's discussion and decision until the next issue so that you and others in your organization may try your own skill at arbitration. How would you decide this case, if you were the Arbiter? Compare your answer with Mr. Nissley's in the next issue.

Machining

Two views of the right half section of the rear axle differential gear case. This casting is made of ferritic nodular iron BHN 163-187.



One of three 7-station Cross transfer machines for machining the right half case for the rear axle differential gear of the Ford automobile. A good maintenance program insures machining to the close tolerances required.

Differential Gear Cases at Ford Sterling

High precision work is required here. The big problem: how to maintain concentricity from bore to bore and drill a cross shaft in the center of a sphere on two planes.

By **Paul A. Meline**
Managing Editor

• The three 7-station transfer machines built by the Cross Company for machining differential gear cases at Ford's Sterling plant are relatively small machines compared to many of their brothers built by Cross and others for Ford. Rarely, however, has a transfer machine been required to perform such high precision work.

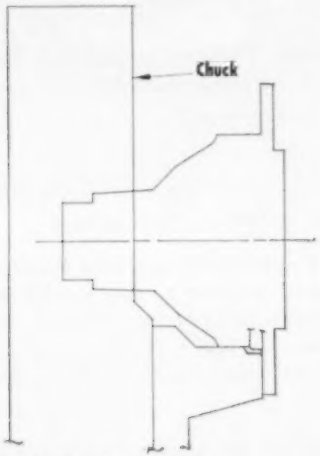
The right half section of the rear axle differential gear case is made of ferritic nodular iron Bhn 163-187. These castings are conveyed to the Cross transfer machines after rough turning, facing and boring operations on Acme Chuckers. The need for precision comes in because the requirements call for two diameters being concentric within .002-in. T.I.R. and two surfaces to be square with the axis of those diameters within .001-in. and run true with those diameters within .002-in. T.I.R. In addition, there was a drilling and reaming problem: getting a cross shaft in the center of the sphere on two planes.

Cross Company and Ford engineers' answer to the problems of maintaining concentricity from bore to bore was to use individual chucks, four to a pallet.

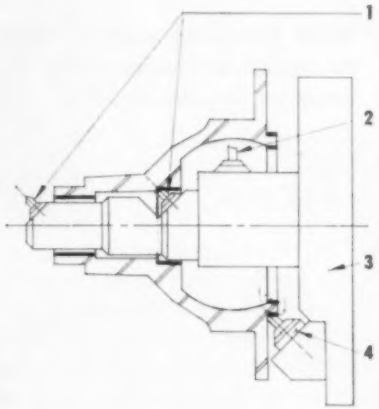
Piece parts turn in their own individual chuck and spindle. All the tools that are boring are from the same boring head. However, while concentricity could be maintained because the part is kept on a common axis all the way through the machine, what would happen to diameter size due to the errors in indexing that would develop is another thing. Here is where Cross engineers came up with a brilliant solution.

To eliminate the possibility of losing diameter size because of indexing errors there is an adjustable device in the second station where by the boring tool is moved to a fixed point on the spindle. On top of the spindle there is a small carbide button. When the chucks are

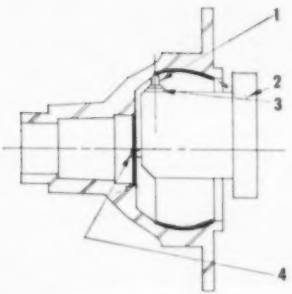
indexed into the second station the head comes forward. A motor lowers the head with three boring tools until it makes contact with the button. The relationship between this button and the center of the axis of the chuck is within a few ten-thousandths. When contact is made the head stops and the cluster of tools make the three



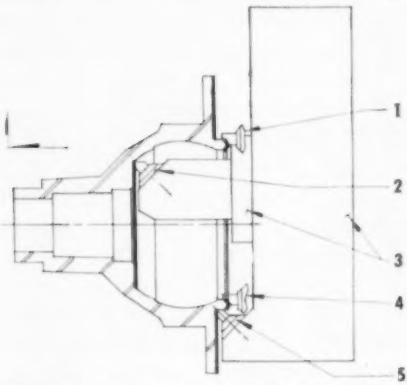
Station 1: Loading station.



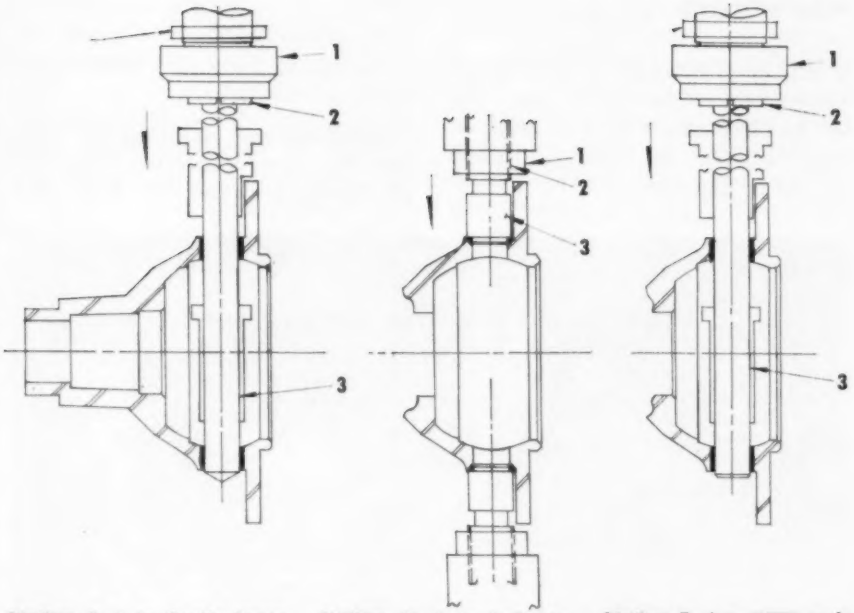
Station 2: 3 boring 1 turning operations. **1 and 2** are boring tools, **3** is boring bar, and **4** is turning tool. All tools have De-Vlieg microbore cartridge, graduated dial.



Station 3: **1** and **3** are cartridge and dial for boring spherical seat; **2** is boring bar; **4** is tool for chamfering side pocket.



Station 4: **1** and **4** are tools for chamfering O.D. and I.D. of mounting pilot; **2** faces gear pocket; **3,** boring bar; **5** faces flange.



Station 5: 1 is Scully-Jones collet type floating holder; 2 is Scully Jones lock and eject type drill chuck; 3 is 23/32-in. drill for drilling pinion gear shaft.

Station 6: 1 is locknut; 2 is adjustable adapter; 3 is chamfering cutter.

Station 7: 1 is "JT" lock and eject collet type floating holder; 2 is lock-eject type reamer chuck; 3 is finish reamer for machining gear shaft.

bore and turning operations in one pass.

A study of the illustrations will show that the tools that are finishing the diameters are single point tools which are boring in such a relation to the plane of index that any index error is nullified due to the error being of a tangential distance.

When a boring tool is positioned to that it is moved in tangential distance, it can move a considerable distance with little change in the bore diameter. Single point tools, of course, will correct eccentricity of preceding operations, if any, and will cut on their own axis.

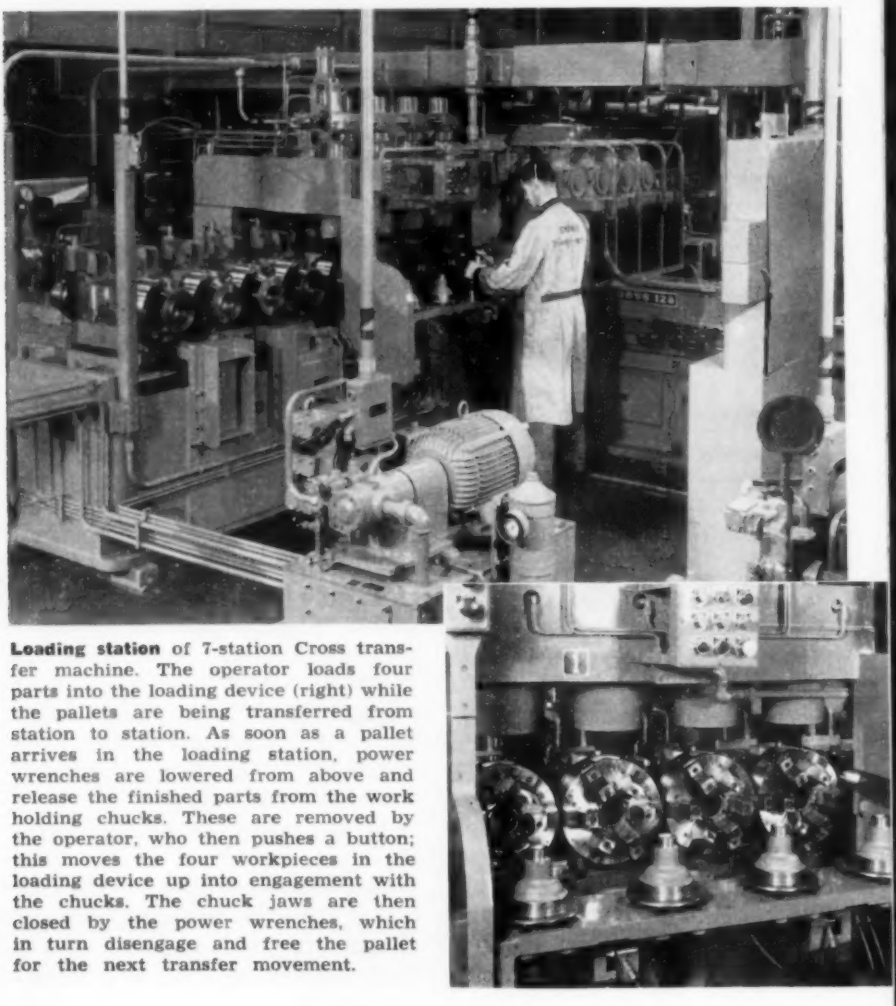
At station 3 the spherical seat radius is generated. In order to maintain correct relationship between the center of the sphere with the gear pocket and flange faces, there are special provisions on the chuck so that location is against a center precision stop.

At station 4 the facing operations are performed on the gear pocket and flange face and the I.D. and O.D. of the mounting pilot are chamfered. As these faces have a fixed relationship within a thous-

andth or two to the center of the sphere, these microbore tools are set to close limits so this relationship between the tool and these points is maintained.

At station 5 the part is no longer turning.

Drilling and reaming the hole for the cross shaft was another problem, because the hole had



Loading station of 7-station Cross transfer machine. The operator loads four parts into the loading device (right) while the pallets are being transferred from station to station. As soon as a pallet arrives in the loading station, power wrenches are lowered from above and release the finished parts from the work holding chucks. These are removed by the operator, who then pushes a button; this moves the four workpieces in the loading device up into engagement with the chucks. The chuck jaws are then closed by the power wrenches, which in turn disengage and free the pallet for the next transfer movement.

to be in the center of the sphere on two planes, longitudinal and transverse.

The rabbit diameter was cut at station 2 to locate the bushings for this drilling operation at station 5. As the bushing plate comes forward it is located into that diameter, which is concentric with the sphere, and against the mounting flange face.

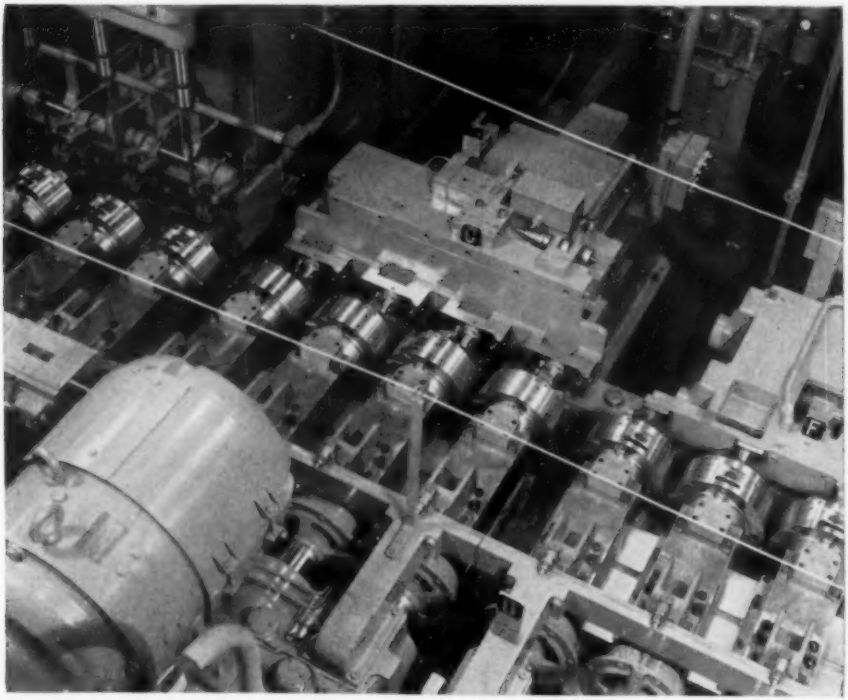
The bushing plate is located individually for each part in this manner. The machine is not depended on the index precisely enough to accomplish this, so the bushings are located from the diameter and face and are brought to exact position before drilling or reaming starts. Each Scully-Jones bushing has float in it—sideways and in-and-out—so it can take its location from the face and the diameter as it goes forward into position.

Chamfering of the cross shaft holes takes place at the sixth station. Two chamfer cutters make their passes simultaneously, one from the top and the other from the bottom. The machine was designed to both rough and finish ream these

Unit E is second station of transfer machine. Here three boring and one turning operations are performed. Unit F is third station. Here spherical seat is bored and side of gear pocket is chamfered.

holes at the seventh station. Eight spindles are provided: four for rough reaming and four for finish reaming. It is because reaming is a relatively short operation that it is possible to first rough ream, then shuttle the finish reamers into position and finish ream the holes all in one position. The head is provided with a shuttling movement so that this can be accomplished. While this was designed with the thought in mind that such an arrangement would save an extra station on the machine, Ford engineers have since eliminated the rough reaming operation. They are now only using four of the spindles.

Machining these gear cases is a precision operation, and to keep the operation within the required limits calls for the care and maintenance associated with precision work. For instance, spindles have to be checked and maintained continuously so that they run true. Fix-

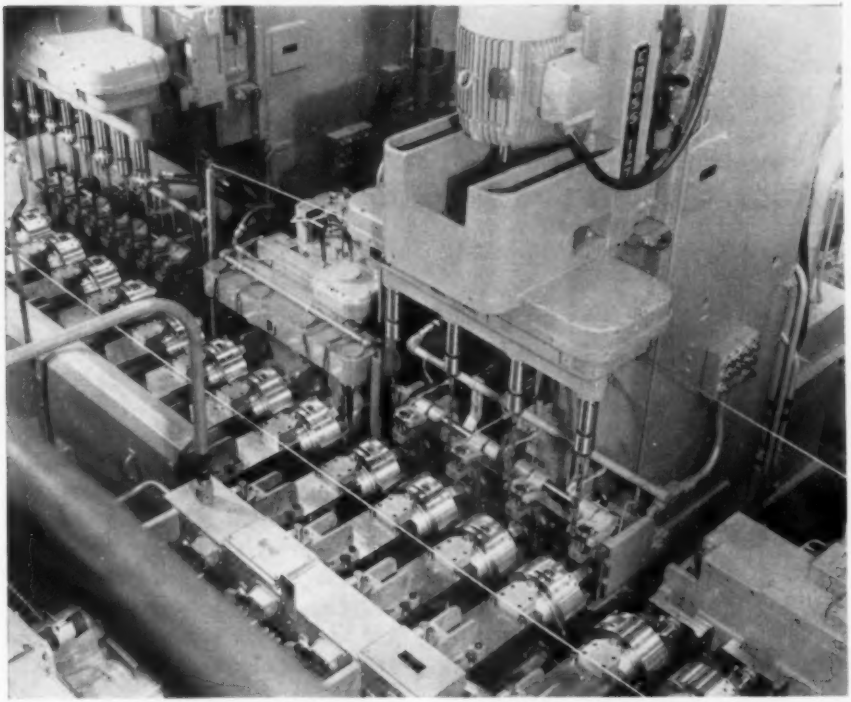


Unit G is fourth station. Operations include facing of the gear pocket and flange and chamfering of I.D. and O.D. of mounting pilot.

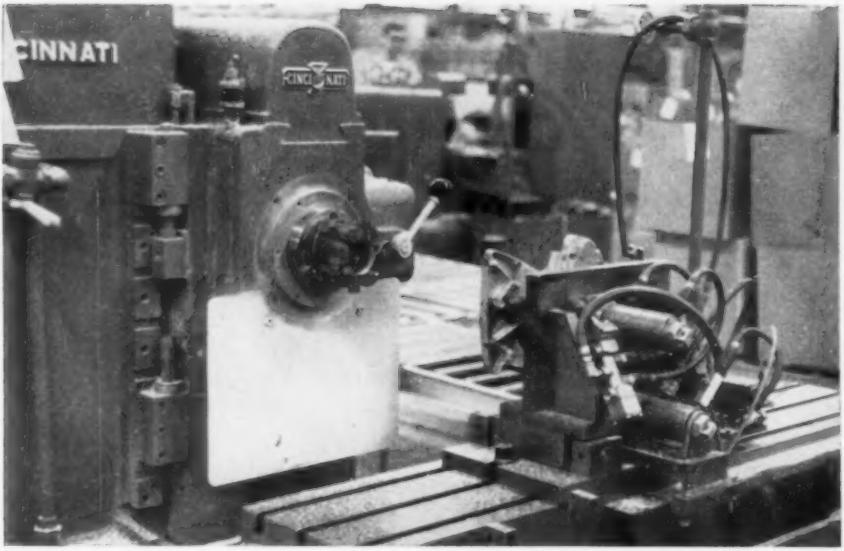
tures are used to check the spindles. A pallet can be taken off the machine and placed in a fixture to check the spindles in a matter of minutes. Inspection equipment includes Sheffield Autometrology and gages for depth, parallelism, location, squareness and diameter. The chucks have to be kept in good condition, and particular attention is paid to the tools. In fact, maintenance of equipment is so important to holding accuracy that tools are programmed in and out of machine at regular intervals to maintain quality.

The compactness of the DeVlieg single point adjustable tools make it possible to cluster multiple tools into the confined areas. Adjustment of the tools is controlled by the graduated dial and vernier scale, which provide direct reading on diameter.

Total production of these cases for the rear axle differential gear is 360 per hour when operating at 100 percent efficiency. • • •



Final three stations, 5, 6 and 7, are shown in this view. Here the chucks are stationary as the pinion gear shaft is drilled, chamfered and reamed.



1. Load position. View shows front of machine, back of fixture.

PROBLEM:

Too Much Idle Machine Time

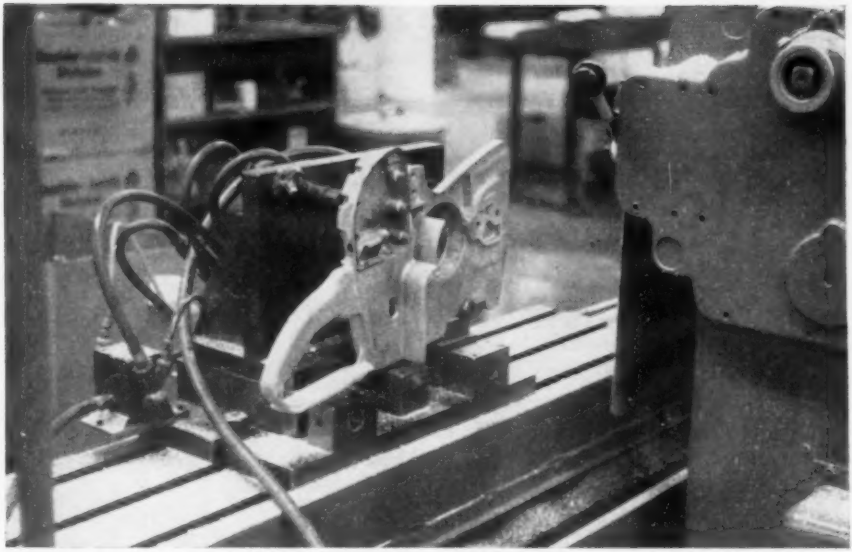
The Homelite plant in Gastonia, North Carolina, recently solved a problem of idle time on a $17,000 machine by employing a new set of cams plus an air operated fixture to consolidate two milling operations into one.

By **Darrell Ward**
Field Editor

• When a part, formerly milled on a Cincinnati Hydramatic, became obsolete Jim Proctor, junior manufacturing engineer, felt that such a machine with a vertical moving head and a horizontal moving table should be utilized for more than simple milling jobs. Why not try milling the two make-up surfaces on the chain saw crankcase housing which is made of die cast magnesium?

Details of the air operated fixture to hold this part were worked out by tool engineer Bill Tyminski.

The part is presented to the cutter in the two different verti-



2. **Beginning of cycle.** View shows front of fixture, back of machine.

SOLUTION:

Combine 2 Milling Operations

cal planes formerly milled in two separate operations. Special cams were obtained to govern the head and table travel.

The sequence of operations for machining the crankcase housing is as follows. Head is in up position, table retracted and in load position. After pressing the cycle start button, the table travels forward to first position and stops. The cutter head makes pass downward over guide bar pad and then returns to up position. Then the table travels forward toward second position and, in the middle of this travel, the air cylinder offsets the holding fixture to the second vertical plane. When the table stops, the head makes a second pass down to cut the face on the oil reservoir seal surface. The spindle stops, and the head retracts to "up" position. The table moves backward to load-unload position, completing one operating cycle which is fully automatic once the start button is pressed.

The cutting cycle time is 34 seconds with the 4½" brazed carbide shell mill cutter turning at 2,000 rpm, fed at 60 ipm.

An average of 64 parts are milled

in an hour. This includes the loading and unloading of parts by one operator, who also handles parts containers moving toward and away from his station by roller conveyor.

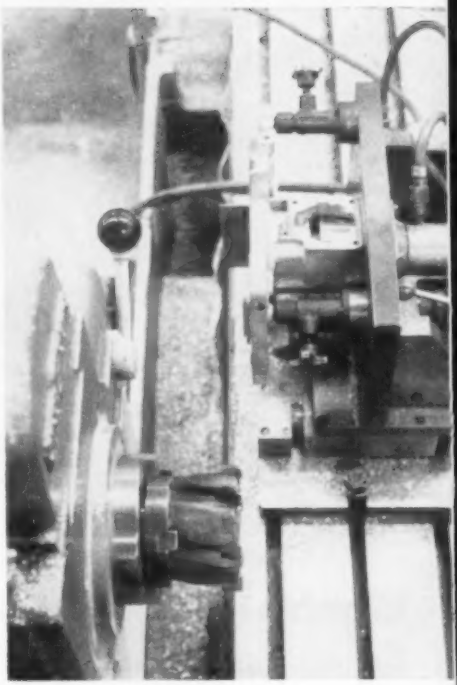
Parts are removed by hand from the die casting vendor boxes of nine parts each. Clamping in fixture is by air cylinder and "C" washer with two snubbers to prevent vibration after the part is first positioned by the locating stud in the handle bar recess. Parts are unloaded by hand, replaced in vendor box, and boxes move to subsequent operations on the roller conveyor.

Jim Proctor said that in working toward optimum conditions, they found that the spindle speed should operate at maximum for this machine, 2,000 rpm.

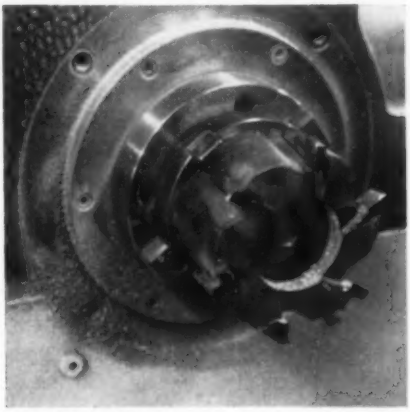
This was about 10 to 12 percent above the recommended starting point for testing a given set up. The first objective was to obtain maximum production, but in this case it turned out to be optimum tool life as well.

The set up can easily hold finish well below specification, since the milled surfaces fit together with gaskets. A maximum cut normally ranges between 0.020″ and 0.030″ in the single pass.

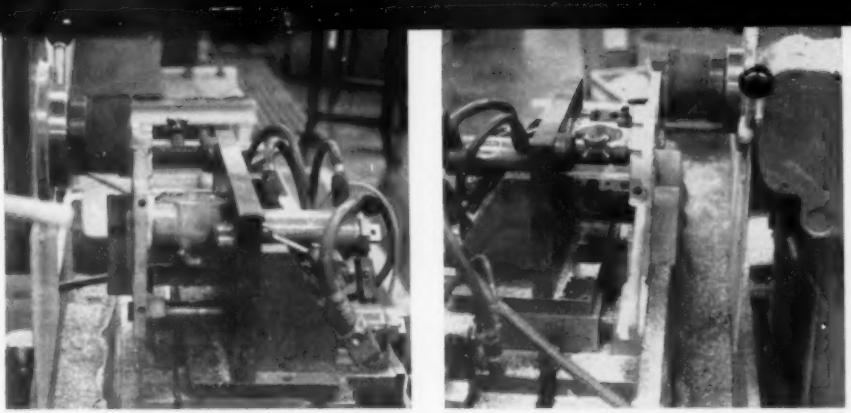
The cutter is a standard model McCrosky with 7° clearance angle and no special modifications. Ap-



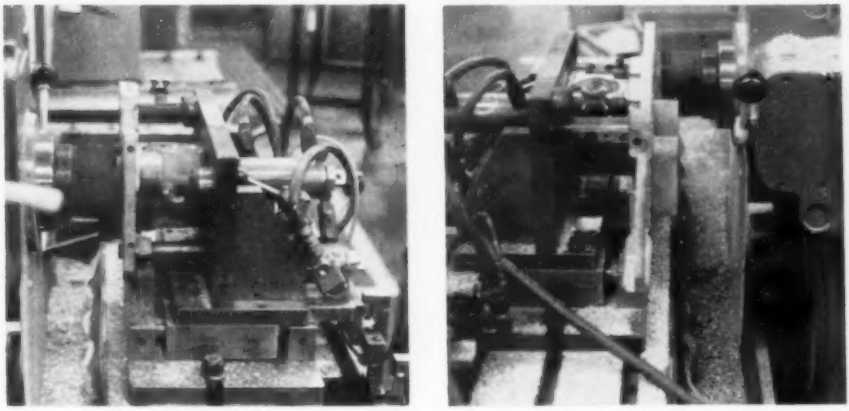
3. Looking down on set-up.



4. Milling cutter.



5. Two views showing how table moves to position for first cut.



6. Cutter makes pass downward for first cut. Two views of machine.

proximately 2,000 to 3,000 parts are machined between sharpenings, but this depends on the finish and trueness of the die cast parts.

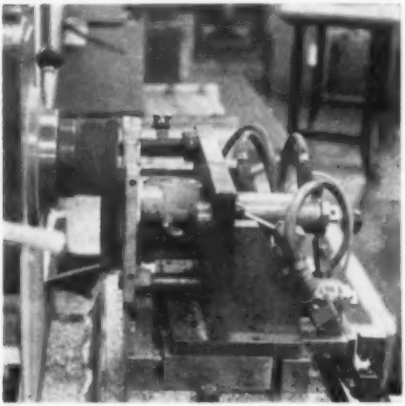
What are the hazards in this magnesium milling operation?

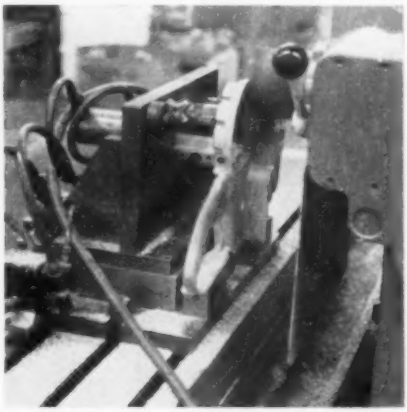
Some particles of the magnesium waste are fine and light enough to float in the air around the machine. These particles are potentially inflammable, but only if set off by a spark or excessive heat. To a good machinist, this is not a serious problem.

Homelite solves the problem easily enough by having the setup man make periodical checks to see that the operation is running properly. The key to efficient operation and safety lies in the set-up man. He notes the appearance of the cutting edge of the tool, the surface finish being obtained, and the number of parts being produced.

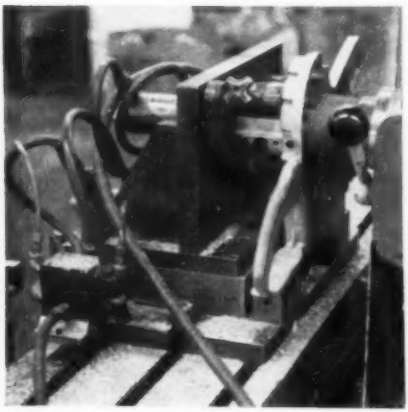
His primary concern is the appearance of the cutting edge.

As soon as any of these factors appear doubtful, the cutter is changed and sent to the tool room for regrinding, average life being estimated at about 16 to 20 hours actual running time. One spare cutter is kept ready for replacement. • • •





7. Cutter returns to "up" position; table moves to second position and offsets. Two views of machine.



8. Cutter comes down for second cut.

9. Piece part with all cuts made.

Processing Small Parts

. . . with an automatic hydraulic drilling, assembly and staking machine

By **Stanley E. Vickers,** President
Vickers Machine & Tool, Inc.

1. Special automatic hydraulic drilling, assembly and staking machine built for processing small parts at Westinghouse.

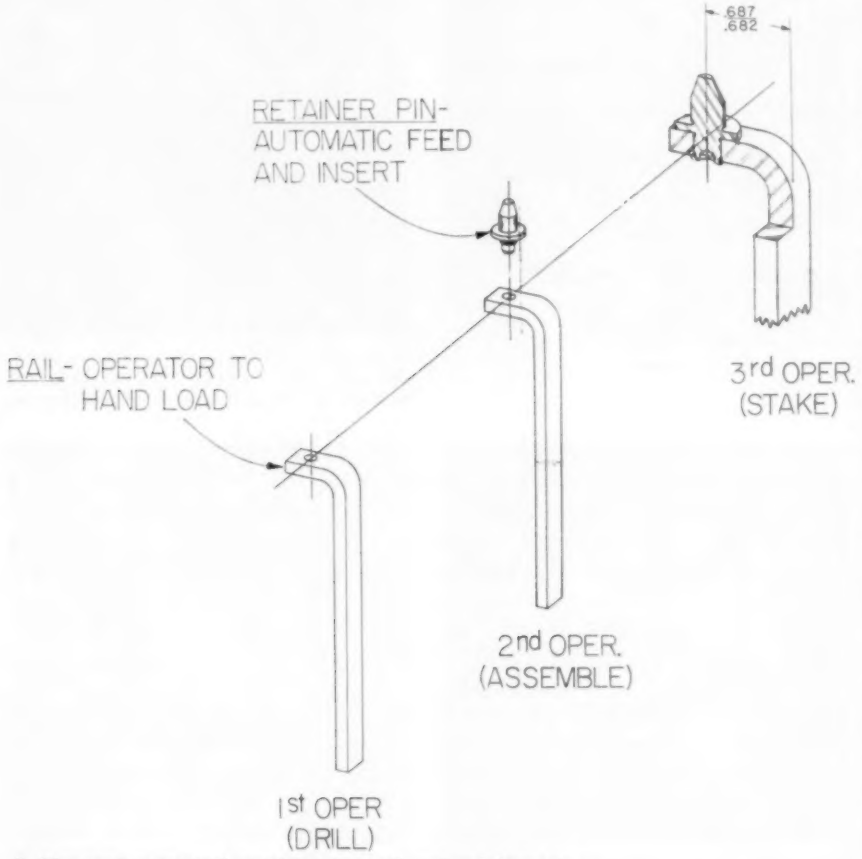
• An automatic hydraulic drilling, assembly and staking machine, as shown in Fig. 1, was built to process and complete a part used in the assembly of a new model unit at the Columbus division of Westinghouse Electric Corp. This part, as identified in Fig. 2, consists of two separate items, a rail and a retainer pin. The projected production requirements and continued use of this item justified the use of a special machine.

This equipment is hydraulic operated and consists of a six-station, automatic indexing table to perform in clockwise sequence a drilling operation, orienting, feeding and insertion of a secondary part into said drilled hole and subsequently completing assembly by staking the two parts together as shown in Fig. 2.

It is required that an operator manually load the rail clip and unload the completed assembly. Three of the six stations provided are for the loading and unloading operation. The indexing table is located on the center of machine base and

extends over the front. The controls provide for either single cycle or repetitive operation together with single operation selection for work stations.

The loading of work requires that the operator manually place the part into proper position. As indicated in Fig. 2 holding the relationship between the base or bottom of part with the centerline location of hole is critical. This must be maintained within .005 inches tolerance. It is this requirement that determined the general design characteristics of tooling as shown in Fig. 4. It may be noted that the rail is so positioned that

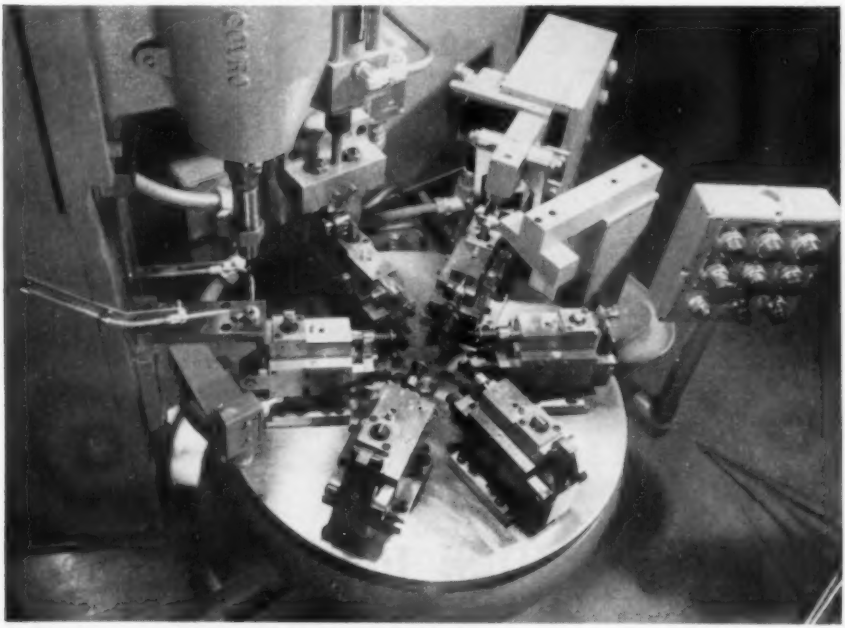


2. The part processed consists of a rail and retainer pin.

the critical locating surface is maintained by using it as a base for clamping. The clamping of the part in tooling is automatically controlled through the vertical movement of the cam shaft which, as shown in Fig. 4, exerts pressure only when raised. This raising of the cam shaft is done within the area of the three work stations and results from the action of a single half barrel type cam mounted within the base of index table. At the extreme right of the table, immediately back of operator control box (see Fig. 3), the tapered wedge, mounted on the overhanging arm, acts as a clamping release by depressing the vertical cam shaft upon leaving the final work station.

Drilling

The drilling of the hole, which is the first work station, located at right, (Fig. 3), is accomplished by mounting a standard purchased component (drill unit) in a vertical position. This is mounted on a weldment designed specifically for the application for which it is to be used. This permits maximum design consideration for adjustment, together with optimum tooling facilities of this area. This, as in most instances, is very important.



3. Close-up of indexing table and work stations.

2741

HIGH LIFT... HEAVY LIFT... OR BOTH!

PORTELVATOR®

ENGINEERED POSITIONING EQUIPMENT

- PORTABLE or STATIONARY
- manual or power operation
- ANY KIND or DEGREE of MOVEMENT
- manual or completely automatic controls

★ Portelvator's mechanical power transmission design locks the top-plate by gravity in any attained position. Application of this transmission to multiple elevating screws provides unequalled safety.

IT'S A HAMILTON TOOL USE IT WITH CONFIDENCE

Write for FREE LITERATURE BATCH No. P-801

THE HAMILTON TOOL COMPANY
826 SOUTH NINTH STREET · HAMILTON · OHIO

Use postpaid card. Circle No. 271

NEW LINE of

STEELWELD HYDRAULIC PRESS BRAKES

Capacities to 2000 Tons

- Positive overload protection.
- Constant power during entire stroke.
- Ram reversible at any point.
- Stroke quickly adjusted for any length.
- Fast ram approach and return—slow-speed pressing.
- Operating pressure simply adjusted.
- Accurate ram level automatically maintained.
- Ram easily tapered.
- Simple, safe to operate.

CLEVELAND CRANE is proud to present its completely new series of Steelweld Hydraulic Press Brakes for bending mild steel from 10 gauge to 2 inches and in lengths to 30 feet.

Heavily built and of finest quality throughout, the machines are of the most advanced design with all features found desirable for ease of operation, maximum production and outstanding performance.

Steelweld hydraulically operated brakes are versatile machines capable of handling a wide variety of operations. They are ideal for jobbing shops, as well as for mass-production work. They work to close tolerances and have ample speed.

The new line of hydraulic brakes supplements the Steelweld line of mechanical press brakes, which Cleveland Crane has been building for more than 25 years, but does not supplant it. Each type of machine has its advantages and careful consideration must be given to the specific application to determine the type and size machine most suitable.

We urge you to get the facts on these new machines that have so much to offer you. Our sales engineers will be glad to give you the details. Or write for our new catalog below.

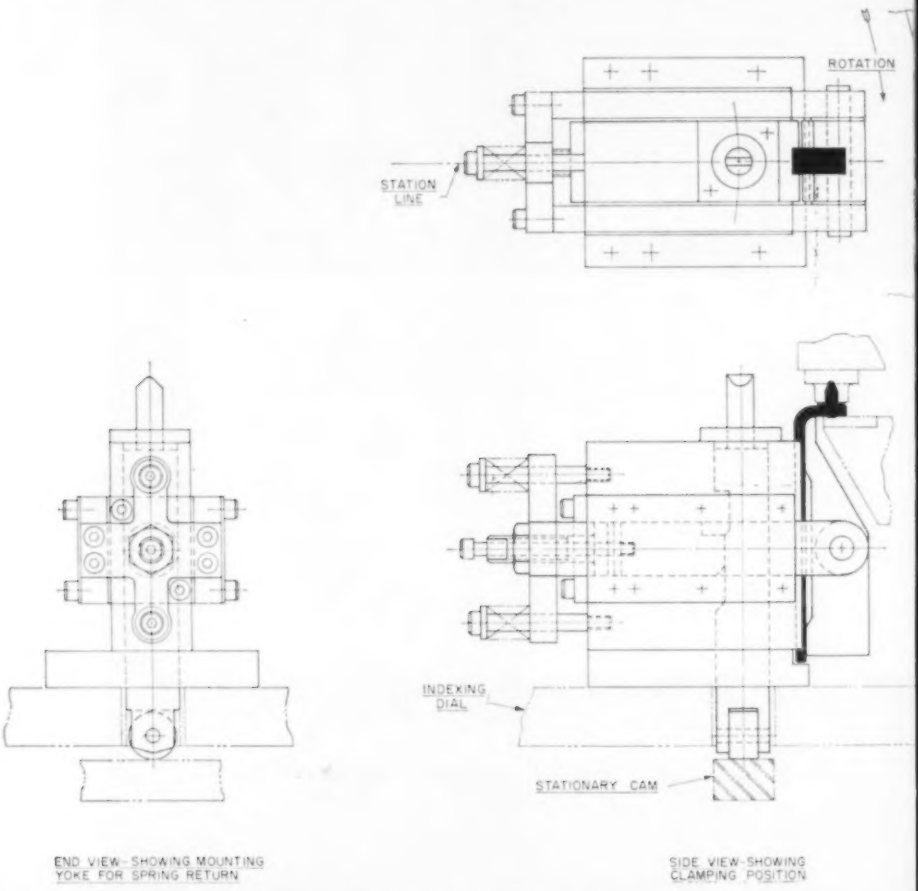
STEELWELD PRESSES

THE CLEVELAND CRANE & ENGINEERING CO.

5269 E. 281st Street, Wickliffe, Ohio

Use postpaid card. Circle No. 272

It is important, not only because of close clearances dictated by the primary design considerations of clamping, but by the provision for accessibility in servicing and maintenance. Since all areas of work are subject to wear, the actual tooling must be replaceable. It is essential that such parts of a machine not only be of the correct material for service but that they be designed in such manner as to require the minimum amount of work to replace. In view of the requirement for close tolerance control over hole relationship, the drill sta-

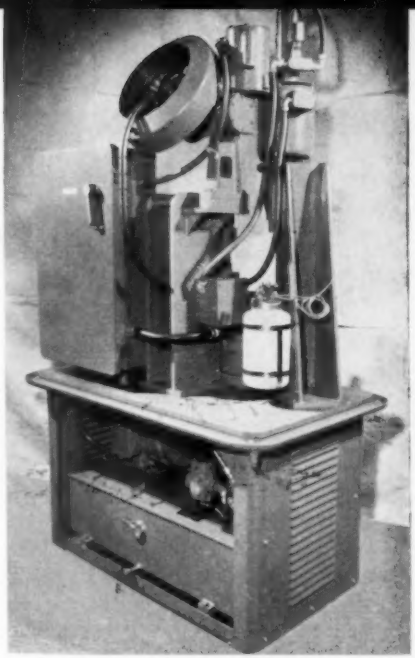


4. Two views showing mounting yoke and clamping position.

tion tooling includes a standard removeable type drill bushing. It should be noted that the position of the drill bushing is as close to the work as possible, conforming to good tooling practice. A further common procedure is the use of a mist type coolant to prolong drill life and assist in chip control. A second air nozzle is located immediately behind the drill station and the function of this is to remove any drill chips which might remain on the upper lip surface of the part before entering the next work station.

Feeding and Assembly

The second work station as shown in Fig. 3 is the position where the secondary part or pin is inserted into the drilled hole. This



5. View showing escapement mechanism.

is the hole drilled in the first operation, since the work progresses clockwise. The finger arrangement for holding or positioning the pin may be more clearly seen in Fig. 1, viewing directly from the front of machine.

The jaws or feet of the fingers are a continuation of the track cross-section. However, they are split on center and are symmetrical forming right and left halves. These are spring loaded and hinged to open upon pressure from the inserting plunger, which is located directly above.

The insertion or assembly mechanism, together with its operating cylinder, is mounted on a second vertical type weldment, the details of which may be more clearly seen in Fg. 5 (rear view of machine). This weldment, it should be noted, is designed to provide combined mounting or installation facilities for the feeder, track arrangement and escapement device. The feeder, mounted at top, is a standard rotating hopper or mechanical type and was selected because of its performance characteristics when associated with the type of part to be fed. This pin, Fig. 2, may be generally classified as having the same feeding requirement as screws or rivets. The configuration of this particular part, however, is such that maximum separation in the bowl or orientation presents the part to the track upside down. As a

result, it was necessary to turn over or reverse the part. Hence the "C" type of track arrangement. Attached to the side of weldment, approximately halfway up, Fig. 5, is the enclosure of escapement mechanism. This is solenoid-operated and consists of an in-and-out arrangement whereby, upon impulse, a slide or gate mounted transverse to track selects one part from the feeding track and transfers another into the inserting mechanism or fingers described initially.

Staking

The staking together or assembly of the two parts (Fig. 2, third operation), is performed at the third work station. The sequencing or staking mechanism consists of two pivoted hinged arms, actuated by linkage. This linkage is powered by an end pivoted cylinder. The motion derived by such action develops two stages and ultimately exerts approximately 6,000 pounds pressure.

The first phase or movement includes the major portion of linkage motion and closes the arms to enclose or secure part. The second stage is actuated in the final or closing movement of linkage and exerts increasing pressures until completion of stroke at dead center. it is this final stage of pressure application which performs the staking operation.

This machine is designed, whenever practical, using standard basic work components. • • •

Effective Lubrication for Power Presses

Application, selection and handling

By **Bruce Dunham**
Industrial Products Department
Sun Oil Company

● In press operations, or for that matter in any metalworking equipment operation, there are three primary areas in which lubrication savings can be realized. They are—application, selection and storage or handling.

Lubricant Application:

Probably the greatest cost in lubrication is that of applying lubricants, particularly if older application methods are used. In addition to labor costs, equipment wear and failure may result from human errors in lubricating "too much" or "too little" or "too infrequently." Many new and efficient automatic systems for applying either oil or grease offer positive lubrication at a much lower overall cost.

Automatic distribution systems for lubricating oils usually have a centrally located oil reservoir from which the oil is distributed to various bearings and machine parts by means of mechanical devices, oil passages or oil piping. Centralized systems are either hand-operated or power-driven and automatic.

Lubricant Selection:

Low initial cost per pound or gallon may not offer the best criterion for selection of a lubricant which will be most economical or an over-all annual basis. The following factors should also be considered in selecting a lubricant for a particular application:

a) Stability—in simplified terms, how long can it be used in service before it will be necessary to replace it?

b) Anti-wear characteristics—how much wear will there be on moving parts in a given period of time? The film strength and frictional properties of the lubricant will have a strong influence on this consideration.

c) Amount of leakage & makeup—how much and how frequently will it be necessary to add lubricant to maintain a given amount in the system? In general, heavy lubricants leak less. For special problem application, "leakproof" lubricants are available.

d) Contamination—what problems of contamination due to dirt, dust, drawing compounds, etc. are present in this application?

e) Rust or corrosion—are there moisture or humidity conditions which should be considered in lubricant selection?

The lowest cost lubricant is the one

HYDRAULIC PRESSES

Hydraulic Pump	Hydraulic Oil (SSU @ 100°F.)
VANE-TYPE PUMPS	
J. S. Barnes Corp.	150
Dudco Div., New York Air Brake Co.	500
Racine Tool & Machine Co.	200
Vickers Inc.—with flow control	150
without flow control	225
AXIAL-PISTON PUMPS	
Denison Engineering Co.	250-300
Dudco Div., New York Air Brake Co.	300
LaPointe Machine Co.	200
Northern Pump Co. (Series 700)	450-650
Sundstrand Machine Tool Co.	150
Vickers Inc.—above 500 lb./in.^{2}	300
below 500 lb./in.^{2}	225
Waterbury Tool Co.	300
RADIAL-PISTON PUMPS	
American Engineering Co.	
Hele-Shaw Pump—below 1500 lb./in.^{2}	500
above 1500 lb./in.^{2}	950
Hydraulic Press Mfg. Co.	950
Northern Pump Co.	300
Series 4300	500
Series 4400, 4500, 4600, 4700, 4800	650
Oilgear Co.	
Types A, B, C, D, H, J, M, Q, R, or W (up to 60 H.P.)	300
Types C or D (100 to 150 H.P.); Type F (up to 10 H.P.)	500
Simplex Engineering Co.	200
Superdraulic Corp.	150
GEAR-TYPE PUMPS	
Browne & Sharpe Mfg. Co.	150-200
Commercial Shearing & Stamping Co.	200
Gerotor May Corp.	300
Hydraulic Press Mfg. Co.	950
Northern Pump Co. (Series 4000)	300-500
Pesco Products Div., Borg-Warner Corp.	150-200
Geo. D. Roper Corp.	300
Sundstrand Machine Tool Co.	150
Tuthill Pump Co.	150
Viking Pump Co.	300

Table I—Hydraulic Press lubrication

which, when prescribed for the operating conditions prevailing for the particular application, offers the longest service life coupled with the least wear and best protective ability.

Mechanical Presses

Table II, "Mechanical Press Lubrition," is a guide to selection of lubricants for mechanical presses. It lists the fundamental parts of this type press, including gears, bearings, slides, counterbalance cylinder parts, motors, and transfer equipment, and suggests the type lubricant best suited to give optimum lubrication in accordance with the application method. The number of lubricants suggested have been cut to a minimum.

How to use the Table

To use Table II, simply locate in the first column, the part which is to be lubricated. As an example, assume that it is a drive gear. In the next column, locate the type of gear, for example, the open type. Going to the next column, find the method of application which is being used to lubricate the open gear. For instance this may be a pressure feed system. The check in the far right columns shows that lubricant E, which is a multi-purpose lithium lead type grease, is recommended for this application.

Description of Lubricants

Before discussing the three oils in detail, it is necessary to explain the meaning of the term "viscosity" which is the measure of an oil's resistance to shear. There are many ways of expressing viscosity. No matter what system

is used, it must be expressed as a certain value at a certain temperature. The most common viscosity unit used by the petroleum industry, is the Saybolt Universal Second, usually abbreviated S.S.U. or SSU.

The procedure for measuring Saybolt viscosity is simple: A quantity of oil is heated to one of three temperatures, 100 F, 130 F, or 210 F, depending upon viscosity. (All hydraulic oils are checked at 100 F.) Then the time required for 60 cubic centimeters of the oil to run through a small hole of specified size is measured in seconds. The number of seconds is the Saybolt viscosity. Thus, if the time required is 300 seconds, the oil is said to have a viscosity of 300 S.S.U. at 100 F. or, more often, 300/100. Sometimes, when the test temperature is obvious, as in the case of a hydraulic oil, the temperature is dropped and the oil is termed simply a 300-second oil, a 500-second oil, and so on.

Lubricant A is recommended for application to piston and cushion packings when cups or pressure fittings or once-through type methods of application are used. It is also recommended for airline oilers and electric motor bearings. It should be a rust and oxidation inhibited oil with a 150 S.S.U. @ 100 F.

Lubricant B can be either a straight mineral oil or an extreme pressure oil in a viscosity range of 85 to 120 SSU @ 210 F. Manufacturers' recommendations should be followed for individual units. Some manufacturers prefer to recommend a mild-corrosive extreme pressure type oil as an insurance against wear due to possible overloading or shock loading. Wear is a very important consideration in press parts. Wear causes looseness and vibration which

LUBRICATION continued

magnifies the effect of suddenly applied loads. Extreme pressure oils are as stable as straight mineral oils, generally having lower coefficients of friction and thus tend to reduce power requirements. There are special designs of mechanical presses for which the manufacturer recommends oils lighter in viscosity than Lubricant B, probably because of flow characteristics or close clearances. Such recommendations should be followed. Less leakage is experienced with heavier oils under pressure than with lighter oils.

Lubricant C is recommended for lubrication of all moving parts of transfer equipment and dispenses from a central system. A 300 SSU @ 100 F. Way-type oil is specified because of its very low friction properties, its extreme pressure characteristics and its retention ability.

Three greases are also recommended in Table I. The commonly accepted measure of grease consistency is the National Lubricating Grease Institute's numerical description generally ranging from No. 0 for the softest or thinnest to No. 5 for the hardest and thickest greases.

Lubricant D should be a NLGI No. 0 sodium or lithium base grease which is light-bodied and suitable for ease of dispensing through pressure systems without clogging separators and small lines.

Lubricant E would be an NLGI No. 2 multi-purpose grease, preferably of the lithium lead type. It is recommended for dispensing through pressure

fittings and is buttery in nature, resistant to both high temperatures and water and embodies abnormally high film strength to counteract high or shock loading.

Lubricant F is used only for open gearing and generally purchased in smaller quantities. It is an NLGI No. 3 adhesive-cohesive type grease which clings to gear teeth and offers more positive lubrication than heavy asphaltic gear compounds.

Hydraulic Presses

Table I presents a handy reference for determining the proper viscosity of hydraulic oil for some of the more popular hydraulic pumps used on press equipment. Viscosities are those recommended by the manufacturer which give maximum efficiency of the pump at normal operating temperatures.

Generally the pump manufacturers recommend a high quality rust and oxidation inhibited oil for new equipment. Such oils are very stable and give long service life.

For systems which have been in use for some time, other types of modern hydraulic oils may be more suitable and more economical. Those systems which leak excessively are best serviced by anti-leak hydraulic oils. These oils reduce leakage substantially and also are fortified with corrosion, rust, anti-wear and oxidation inhibitors.

For systems which are continuously contaminated, industrial detergent-dispersant oils constantly keep the systems clean and free from clogging difficulties. The best hydraulic oil for a given system is the one which suits the operating conditions to keep the press in trouble-free operation.

Lubrication of press parts other than the hydraulic system is covered under Table II, presented on page 124, 125.

TABLE II - SELECTION CHART FOR PRESS LUBRICATION

PART	TYPE	METHOD OF APPLICATION	OILS			GREASES		
			A	B	C	D	E	F
BEARINGS	DRIVE SHAFT	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
	INTERMEDIATE	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
	SHAFT	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
		PRESSURE FITTING - GREASE					X	
	CRANKSHAFT	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
		PRESSURE FITTINGS - GREASE					X	
	PITMAN	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
		PRESSURE FITTING - GREASE					X	
	SADDLE (BARREL OR BALL&SOCKET TYPE)	RESERVOIR OR CENTRAL SYSTEM - OIL		X				
	WRIST PIN	CENTRAL SYSTEM - OIL		X				
		PRESSURE FITTING - GREASE					X	
	FLYWHEEL	PRESSURE FITTINGS OR HAND PACKED-GREASE					X	
	CLUTCH	PRESSURE FITTINGS - GREASE					X	

PART	TYPE	METHOD OF APPLICATION	A	B	C	D	E	F
DRIVE GEARS	OPEN	HAND						X
		PRESSURE FEED SYSTEM					X	
	ENCLOSED	AUTOMATIC SYSTEM OR BATH		X				
GIBS & INNER GUIDE SLIDES		AUTOMATIC SYSTEM - GREASE				X		
		PRESSURE FITTINGS - GREASE					X	
		CENTRAL SYSTEM - OIL		X				
COUNTERBALANCE CYLINDERS	PISTON PACKINGS	CUPS OR PRESSURE FITTINGS - OIL	X					
		CENTRAL SYSTEM - OIL		X				
	CUSHION PACKINGS	CUPS OR PRESSURE FITTINGS - OIL	X					
		CENTRAL SYSTEM - OIL		X				
	ROD BUSHINGS	PRESSURE FITTINGS - GREASE					X	
		CENTRAL SYSTEM - OIL		X				
	CUSHION GUIDE SURFACES	CENTRAL SYSTEM - OIL		X				
		PRESSURE FITTINGS - GREASE					X	
		AUTOMATIC SYSTEM - GREASE				X		
TRANSFER EQUIPMENT		CENTRAL SYSTEM			X			
BEARINGS OF ELECTRIC MOTORS		ANY METHOD - OIL	X					
		PRESSURE FITTINGS - GREASE					X	
ANY PARTS LUBRICATED BY AIR		AIRLINE OILER	X					

TABLE II - SELECTION CHART FOR PRESS LUBRICATION

PART	TYPE	METHOD OF APPLICATION	OILS A	OILS B	OILS C	GREASES D	GREASES E	GREASES F
BEARINGS	DRIVE SHAFT	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
	INTERMEDIATE	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
	SHAFT	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
		PRESSURE FITTING - GREASE					X	
	CRANKSHAFT	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
		PRESSURE FITTINGS - GREASE					X	
	PITMAN	CENTRAL SYSTEM - OIL		X				
		AUTOMATIC SYSTEM - GREASE				X		
		PRESSURE FITTING - GREASE					X	
	SADDLE (BARREL OR BALL & SOCKET TYPE)	RESERVOIR OR CENTRAL SYSTEM - OIL		X				
	WRIST PIN	CENTRAL SYSTEM - OIL		X				
		PRESSURE FITTING - GREASE					X	
	FLYWHEEL	PRESSURE FITTINGS OR HAND PACKED-GREASE					X	
	CLUTCH	PRESSURE FITTINGS - GREASE					X	

PART	TYPE	METHOD OF APPLICATION	A	B	C	D	E	F
DRIVE GEARS	OPEN	HAND						X
		PRESSURE FEED SYSTEM					X	
	ENCLOSED	AUTOMATIC SYSTEM OR BATH		X				
GIBS & INNER GUIDE SLIDES		AUTOMATIC SYSTEM - GREASE				X		
		PRESSURE FITTINGS - GREASE					X	
		CENTRAL SYSTEM - OIL		X				
COUNTERBALANCE CYLINDERS	PISTON PACKINGS	CUPS OR PRESSURE FITTINGS - OIL	X					
		CENTRAL SYSTEM - OIL		X				
	CUSHION PACKINGS	CUPS OR PRESSURE FITTINGS - OIL	X					
		CENTRAL SYSTEM - OIL		X				
	ROD BUSHINGS	PRESSURE FITTINGS - GREASE					X	
		CENTRAL SYSTEM - OIL		X				
	CUSHION GUIDE SURFACES	CENTRAL SYSTEM - OIL		X				
		PRESSURE FITTINGS - GREASE					X	
		AUTOMATIC SYSTEM - GREASE				X		
TRANSFER EQUIPMENT		CENTRAL SYSTEM			X			
BEARINGS OF ELECTRIC MOTORS		ANY METHOD - OIL	X					
		PRESSURE FITTINGS - GREASE					X	
ANY PARTS LUBRICATED BY AIR		AIRLINE OILER	X					

February, 1959

125

Continued Metallurgical Advances Seen for 1959 with . . .

Higher Temperature Metals,

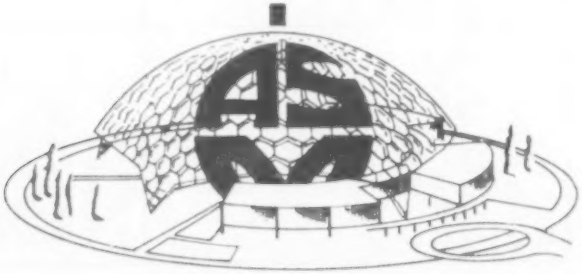
CLEVELAND, OHIO: Metallurgical achievements in 1958 indicate even more amazing strides will be made during the coming 12 months.

In a year-end report, Dr. Clarence H. Lorig, president of the American Society for Metals, and technical director of Battelle Memorial Institute in Columbus, Ohio, highlighted the generation of heat hotter than the sun, the perfection of two new steels, one with the highest tensile strength of any metal on record, and a new "explosive forming" technique for shaping metal.

These and other metals developments prompt Dr. Lorig to observe that "we are on the threshold of even greater achievements in meeting space age demands. The past year has seen huge strides by our metals experts who today are working with metals subjected to temperatures as low as -434°F. and as high as 5,000°F."

Low Temperatures—In discussing extremely low temperatures, the ASM president, holder of 11 metals patents, pointed out that the liquid fuels used in missiles are so cold (they approach absolute zero) that they affect the ductility of metal. These temperatures range from -346° to -434°F. Some stainless steels, and certain copper, aluminum and titanium alloys can store liquified gases, but "there are many problems associated with their fabrication which seek more satisfactory solutions." One of these being the corrosive tendencies of certain missile fuels.

Extremely High Temperature—On the opposite temperature scale and proving effective in melting and applying metals and compounds having extremely high melting points is a new device, the "plasma-jet" which passes high velocity inert gases through an electric arc to develop upwards of 30,000°F, heat three times hotter than the sun. Tungsten, tantalum, columbium and other refractory metals are easily melted by this to build shapes on mandrels or coat surfaces



New Forming Methods

of other materials that must withstand high heat. The answer to re-entry from outer space may be here.

High Tensile Steels—Two steels introduced in the past year offer greater strength, excellent formability and are readily welded. First of the two steels is an air cooling, ultra-high strength alloy for sheet forms with tensile strengths up to 280,000 pounds per square inch. The second steel, hardly out of the laboratory, has shown strengths to 400,000 psi, the highest level ever reached by metal. If production presents no serious problems, it will compete favorably with titanium alloys. It is reported also to have high ductility down to -385°F.

New Forming Methods—Perfected this past year, "explosive forming" or "high energy rate" metal forming takes advantage of the little understood phenomenon in metals whereby a viscous state is created through great and rapidly applied pressures obtained from dynamite or TNT. Complicated shapes can be produced by this revolutionary method in a fraction of a second and in some cases without dies. A new machine developing extremely high pressures and releasing them instantly with a force comparable to a dynamite explosion is currently attracting attention. This compact new machine can turn out parts now requiring very large presses.

Powder Metallurgy—Metal powders have been advanced in two areas. One is the production of parts from a new low-alloy iron powder having strengths up to 190,000 pounds per square inch. The other is the making of metal strip directly from metal powders. Copper and nickel have been successfully rolled to a thickness of 0.050 to 0.060 inch with 11-inch widths at a rate of 6 feet per minute.

Vacuum Melting—Something out of "Buck Rogers" is electron beam vacuum melting. Raw metal is fed into a vacuum chamber and melted by means of an intense beam from an electron gun. The process is now producing metals of extreme purity. Columbium, tantalum, molybdenum, beryllium, and some stainless alloys and steels have been successfully melted.

Titanium Alloys—Titanium is arousing new interest with the introduction of three new alloys one of which, an all-beta alloy, can be heat treated to a strength of 240,000 psi. Because of its strength, lightness, formability and weldability the new alloy is expected to find widespread applications in aircraft and missiles.

Bringing interesting metallurgical achievements closer to home, according to Dr. Lorig, is the use in many 1959 automobiles of steel mufflers and other parts that have been protected from corrosion by aluminum coatings. Ceramics are used also to protect steel parts from corrosive actions. • • •

COGSDILL TWIST DRILL

the name to remember for quality . . .

to watch for progress

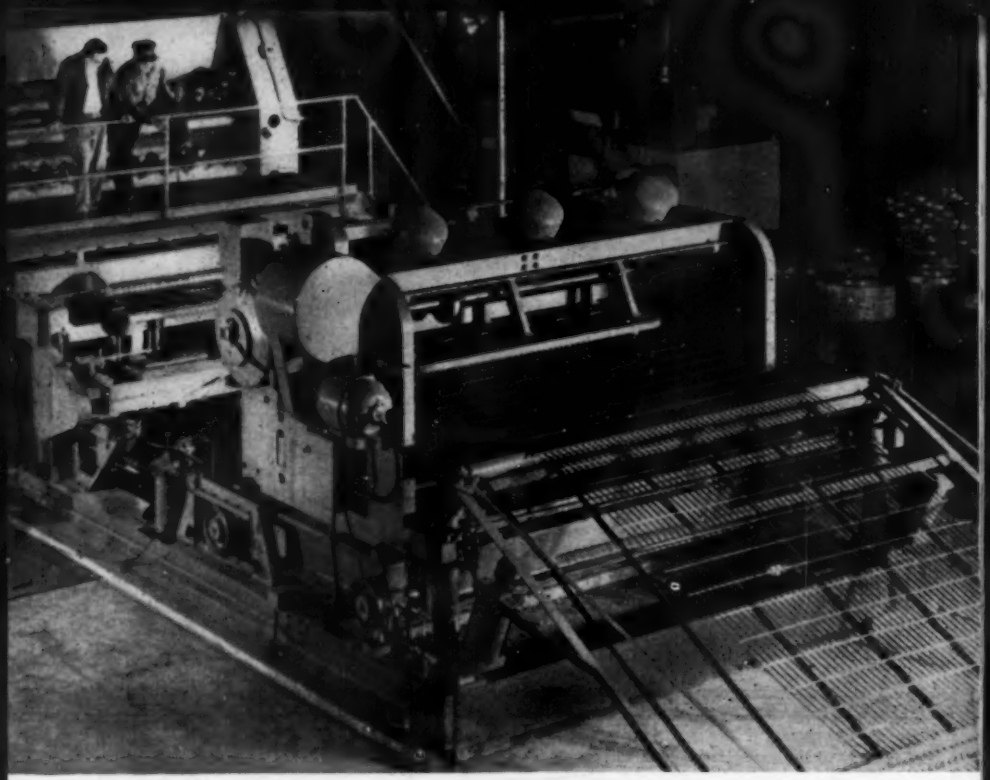
We are pleased to announce that effective immediately the Cogsdill Twist Drill Co., Inc., will be operated as a wholly owned subsidiary of The Sheffield Corporation, Dayton, Ohio.

A complete line of drills and center drills will be manufactured in Greenfield, Massachusetts and will be distributed nationally by the same Cogsdill Distributors who have been serving industry in the past. Cogsdill's "Micro-Limit" countersink and other special cutting tools will not be included.

Cogsdill's Mercury, Black Panther, Economy and Chip-Flow trade names have been synonymous for quality and performance for 46 years and we pledge that these fine products will continue to give the same outstanding service and performance under our new organization.

COGSDILL TWIST DRILL CO., INC., Greenfield, Massachusetts

Use postpaid card. Circle No. 280



Cincinnati® Shear cuts wire mesh at Pittsburgh Steel

The Cincinnati® Shear shown is part of an automatic wire welding machine at Pittsburgh Steel Company, Monessen, Pennsylvania. The machine produces wire mesh and fabric used for concrete pipe, buildings, and other applications. The photograph shows the shear cutting forty-seven 2/0 gauge (.331") wires per stroke. The wire is low carbon, cold drawn steel. Other jobs require shearing mesh with wires up to ½" diameter. This shear was specially engineered for this type of application. Because cuts are heavy and production is continuous, Cincinnati dependability is esssential.

Standard Cincinnati® Shears offer such productive features as powerful hydraulic hold-downs, all-steel interlocked construction, and one-clearance shearing of different metal thicknesses.

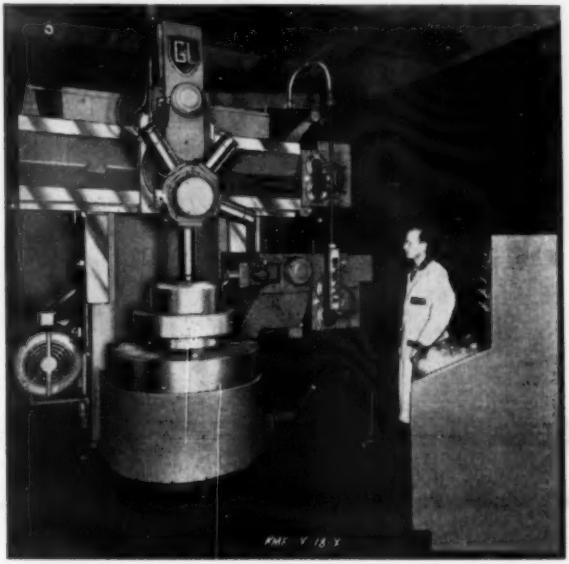
Write Department G for Shear Catalog S-7R.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio

Use postpaid card. Circle No. 282



Vertical Turret Lathe with Discrete Positioning Control

● New techniques perfected by the Kaukauna Division, Giddings & Lewis Machine Tool Company, Kaukauna, Wisconsin, put numerically controlled vertical turret lathes solidly into industry's tool box.

The tape system exercises complete control over feeds, speeds, turret indexing, automatic dwell, and coolant supply, as well as all auxiliary functions the machine is capable of performing, such as constant cutting speed, thread cutting, drum scoring, cutting of tapers, and step turning. In programming, movements of the heads and table can be co-ordinated so as to minimize cycle time and avoid mechanical interference. Head and ram motions can be programmed for simultaneous feed to permit moving

continued

tools at 45°. Rotation of power turrets can be controlled in either direction. Substantial cost savings are made possible when complex operations and the rate of stock removal are supervised rigidly by this relatively straightforward programming procedure.

With the override adjustment feature the operator can add his information to the data system in the form of fine adjustments to either height or radius. Once such adjustments have been made, they automatically become part of the program. These may be adjustments made during setup or actual operation to compensate for tool deflection or wear. This makes it easy to hold critical workpiece dimensions by adjusting the controlled position of the cutting tools over a range of ±0.010". Under proper conditions of

Tape reader is on a sliding tray below the sloping control panel. Standard eight-channel reader is equipped with a rewind and take-up reel.Using a loop storage box permits the tape program to be spliced into an endless belt and repeated over and over without reloading.

TABLE SPEED, SPECIAL CODES	DATA FOR RAIL HEAD					DATA FOR SIDE HEAD				
COL. 1	2	3	4	5	6	7	8	9	10	11
XX	XX	XX.XXX	XX	XX	XX	XX	XX.XXX	XX	XX	XX

Typical manuscript from which the tape is punched on a standard electric perforating typewriter. Column entries are digits, letters, or both, depending on the codes established for table speed, feed direction, end position, feed rate, turret index instruction, and position-adjusting potentiometer. The following is an explanation of the type of information used in each column:

Column 1 Data for table speeds or special codes
Columns 2, 7 Feed direction (one or two alphabetic characters)
Columns 3, 8 End position to .001"
Columns 4, 9 Feed rate
Columns 5, 10 Turret index instruction
Columns 6, 11 Designation of position adjusting potentiometer

tooling, the trimmers require setting only once at the start of the production run.

Adjustments are made through a bank of 50 potentiometers in the operator's console. Their use makes possible automatic machining to close tolerance limits, and setup time can be reduced by many hours. Tape can be used economically for any job that will be repeated, even once, at any future date. Operator "tunes in" the programmed setup.

Before the first completely automatic cycle is performed on a new piecepart, the operator adjusts each head individually by cycling the machine in steps, or by operation, making the necessary "tuning" adjustments as he goes. Four special modes of operation

continued

are provided to facilitate and speed these procedures:

1. **Single-head operation**—One head functions normally under tape supervision while the other is turned off by means of a selector switch.

2. **Single-cycle operation**—The machine completes one line in the tape and then stops. The start button must be actuated for each new step. One or both heads may be operative.

3. **Operation repeat**—A given program step may be repeated any number of times, giving the operator a chance to check accuracy and make adjustments. He can assume manual operation at any time, take a sample cut, and then push the "repeat" button for returning the machine to the point at which he took over. An accurate double-check on the amount of any correction can be made by reading the circular microdials on the feedbox. They give a direct indication to .001" of the original and corrected positions.

4. **Manual operation**—By turning the "manual-tape" selector switch, the operator can convert the machine to a conventionally controlled turret lathe and make test cuts for gauging.

After the setup has been completed for all heads, automatic operation can begin. The operator just turns the selector switch from "single-cycle" to "automatic." Adjustments are so easy

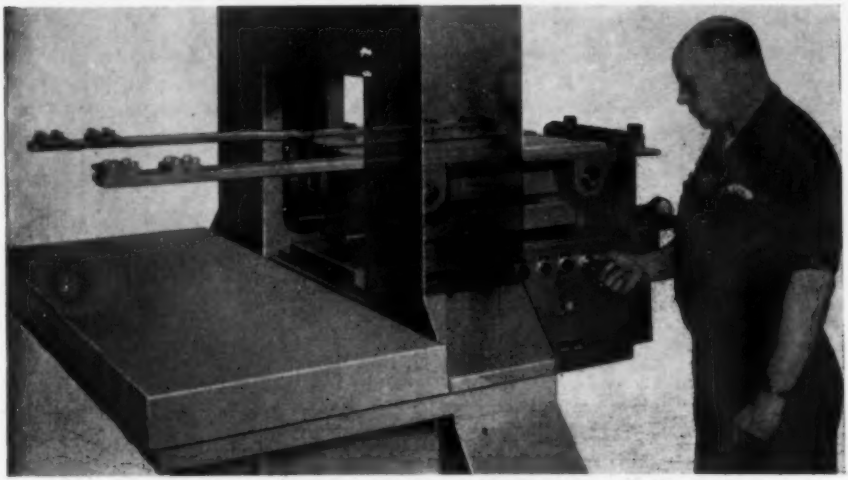
and fast it is now economical to set up short-run jobs for automatic production. And, since there is storage of skills on the tape, greatest savings are realized on repeat runs or when replacement parts are to be produced.

Downtime for tool changes is minimized and programming is simple and direct. Only a standard 8-channel Flexowriter typewriter is required to prepare a tape from the programmer's worksheet. After the first piece has been completed, the tape automatically selects the proper adjustment control and no further operator attention is required.

Tape controlled Giddings & Lewis vertical turret lathes are available in 32, 42 and 52-in. diameter table sizes.

• • •

continued



Unit Converts Single-Action Presses into Transfer Feed Presses

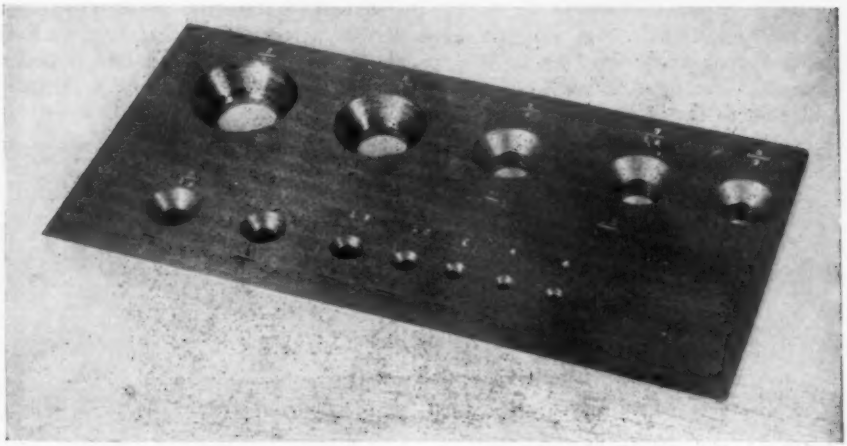
WARREN, MICH.—A versatile new automation unit that converts any single-action press into a transfer feed press is now available from Press Automation Systems, Inc.

This compact unit, called the Trans-Feed, will feed strip stock or parts into and out of press die areas automatically. It can feed material between dies in a press or transfer and feed two or more presses in a line.

The PAS Trans-Feed bolts on the press bolster plate and can be moved from one press to another to provide automation for job-lot pressroom operations. Cast aluminum construction reduces weight and inertia forces of the transfer feed press unit.

Air cylinders operating through ball bearing linkages control all movements of the Trans-Feed. In a typical operating sequence, fingers on parallel horizontal arms on the unit move towards each other to grip the part. Next the arms advance the part into the next die or station. Then the part is released and the arms retract to start position. One or more pairs of fingers are mounted on the arms in accordance with the number of operating.

All JIC standard electric controls for the Trans-Feed cycle are enclosed in a pushbutton panel on the side. • • •



1. Easy to make gage, 3" x 6" x 5/16".

Depth Setting Gage for Countersinking Screws

By **H. J. Gerber**

● Setting of correct depth when countersinking all common sizes of flat head machine screws is simplified when you use the gage illustrated in Fig. 1. This gage is very easy to make and will save you time as well as preventing spoiled work on virtually any job which involves the use of flat head machine screws.

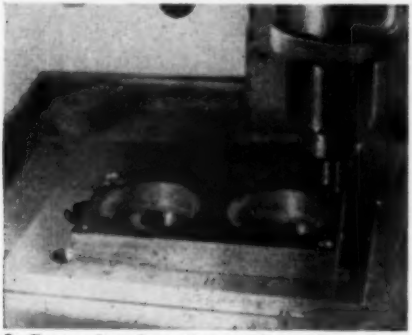
The gage is made from a piece of flat cold finished steel bar stock; this one measures 3" x 6" x 5/16" thick. The plate is laid out and drilled with a series of holes equal in size to the diameters of the most commonly used machine screws ranging from ¼" down to No. 4. Each of these holes is then countersunk to the standard 82 degree angle. Size of these countersinks is carefully measured by trying a screw head of the proper size in each hole. This must be done with great care as the gage accuracy will determine the accuracy of any subsequent job it is used on.

Use of the gage is simple: work is placed on the drill press table (Fig. 2) and the gage placed on the top surface of the work. The drill press spindle is then lowered to bring the countersinking cutter down tightly into the counter-

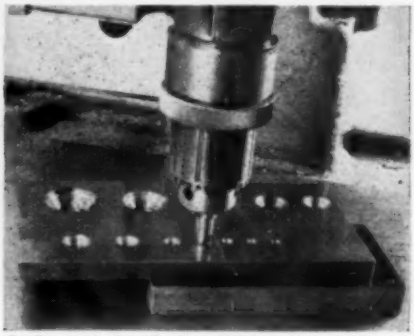
sink of the desired size in the gage. While held tightly in this position the drill press spindle stop is adjusted and locked.

The spindle will now stop at this depth as long as the stop setting is not changed. The gage is now taken off and placed under the work and you are ready to proceed with the countersinking of the work with no further attention to depth adjustment, Fig. 3.

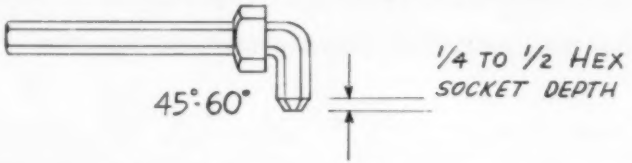
It will be seen that because the gage acts as a base for seating the work it should be rather large in area in order to accommodate both large and small size workpieces. • • •



2. Gage placed on top surface of work.



3. Correct depth is certain.



Using the Hex Wrench Effectively

By **Phillip E. Johnson**

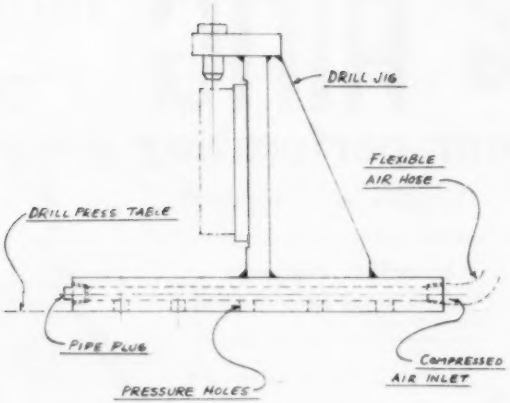
• Any time you want to increase production and reduce fatigue in operations involving repeated use of hex wrenches, try one or both of these simple but effective methods.

First: Slide a hex nut over the handle and force it up to the start of the right angle bend. In case of a loose fit, it may be necessary to tack weld the nut in place.

Since this allows the fingers to get around the wrench, it not only reduces the "pick-up" time but also reduces the time needed to reshift the wrench in the hand.

Second: Adding a 45° to 60° chamfer to the business end of the wrench reduces the insertion time. The length of the chamfer should be ¼ to ½ of the depth of the socket depending upon the clamping pressures involved.

• • •



Weight Reduction with Air Pressure

By **Cliff Bossmann**

• When a large drill jig has to be moved from one spindle to another, it imposes quite a physical strain on the operator. The weight of the jig may be considerably decreased by using the approach shown in the sketch when table has no T-slots or holes in it. A flexible air hose supplies the jig base with a stream of compressed air. The air, in attempting to escape out of the pressure holes, exerts a downward thrust on the drill press table which has a tendency to pneumatically raise the base. This lifting effect lightens the jig and makes moving it a much easier task. This principle may be applied to any heavy tool which is frequently moved while in use. • • •

Specify **RING** **PUNCHES AND DIES**

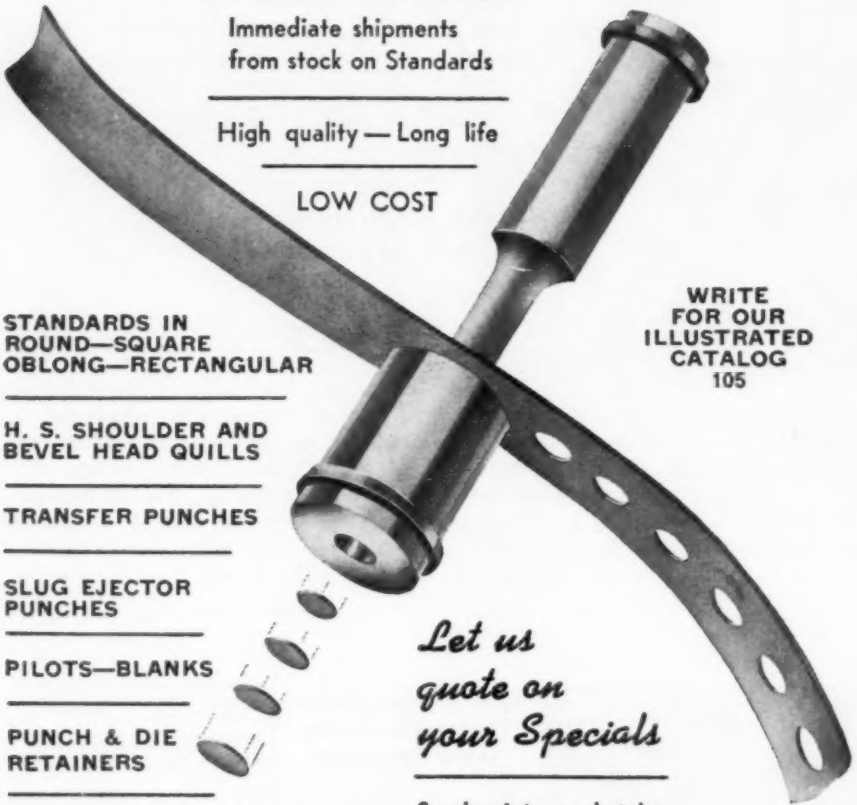
for your perforating problems

Complete interchangeability

Immediate shipments from stock on Standards

High quality — Long life

LOW COST



STANDARDS IN ROUND—SQUARE OBLONG—RECTANGULAR

H. S. SHOULDER AND BEVEL HEAD QUILLS

TRANSFER PUNCHES

SLUG EJECTOR PUNCHES

PILOTS—BLANKS

PUNCH & DIE RETAINERS

CHOICE OF STEELS

WRITE FOR OUR ILLUSTRATED CATALOG 105

Let us quote on your Specials

Send prints or sketches for prompt reply.

RING PUNCH & DIE, INC.

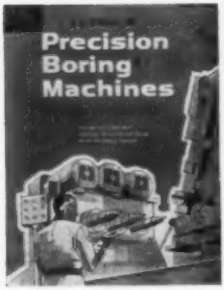
27 FENTON PLACE **JAMESTOWN, NEW YORK**

Use postpaid card. Circle No. 286

Free Literature

MACHINE AND TOOL blue book

(See Number 1)



(See Number 2)

(See Number 3)

To receive copies of booklets described below, simply circle corresponding numbers on one of the handy postage-free Action Cards found opposite page 64 and page 128.

1. "Gaging Threads For High Reliability . . ." is brochure on the Tri-Roll thread comparators. Inspection unit indicates not only that a piece is good or bad, but shows where the part lies in the tolerance range. Only 12 different frame sizes are required to cover the dia. range from No. 0 to 3¾". Types of gage rolls are diagrammed, with instructions for selecting. Pratt & Whitney Co., Inc., Charter Oak Blvd., W. Hartford 1, Conn.

2. Precision Boring Machines. Construction details and machine applications for the largest standard horizontal precision boring machines in the Ex-Cell-O line are provided in recent brochure. The machines are heavy-duty, hydraulically operated models that accommodate large workpieces. Style 771 is a single-end machine; style 772 is for double-end operations. Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

3. Milling and Boring Operations. Recent book published, "Winning Combinations That Reduce the Cost of Chips," tells how to improve milling and boring operations at reduced costs. Subjects discussed are the importance of matching cutters to capabilities of machines, setup and cutter sharpening equipment, milling and boring cutters, etc. Cutter Div., the Ingersoll Milling Machine Co., 505 Fulton Ave., Rockford, Ill.

4. Band Saw Machine is designed to provide the ruggedness, rigidity, variable speed range, and other characteristics needed to control the high speed blade with maximum efficiency. Milband machine is introduced in folder from the Henry G. Thompson & Son Co., New Haven 5, Conn.

5. Chain Catalog. New 98-page catalog features a complete line of roller chains, sprockets, conveyor chain attachments, plus engineering formulas and installations. Acme Chain Corp., Holyoke, Mass.

6. Surface Grinders. "If it fits in the palm of your hand, grind it on the Sanford Model SG," says booklet available from the Sanford Mfg. Corp., Union, N. J. Combines split-tenth accuracy with compactness, high speed and easy controllability. Sanford Mfg. Corp., 1020 Commerce Ave., Union, N.J.

Free Literature

continued

7. Gear Checker, Model 1218A, with an integrated optical system for accurate checking of gear leads, is described in Bulletin 1218-A. Machine is said to eliminate gage blocks, multiple settings, micrometers, verniers and gear trains from the setup procedure. Capacities and specifications discussed. Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12.

8. Building With Steel Castings. Product Design Studies No. 91 is the winning entry in the third Product Development Contest sponsored by Steel Founders' Society of America. Examples are given of engineering economy when building with steel castings for rolling mill equipment. Well illustrated. Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, Ohio.

9. Quick Change Holders, for use in Cincinnati toolmaster milling machines, Models 1A and 1B, are described in literature. Advantages claimed are changing tools faster, positive drive for end mills and greater tool selection. Drive nuts and holders are illustrated and described. The Weldon Tool Co., 3000 Woodhill Rd., Cleveland 4, Ohio.

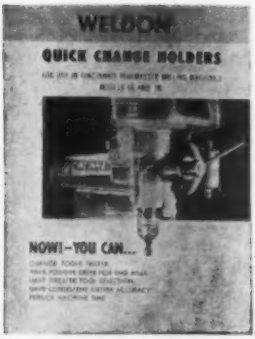
10. Mounted Wheels. Bulletin No. 1505 illustrates the wheels full size, with dimensions and prices. There are 200 standard sizes and 86 standard shapes in a variety of bonds, including vitrified, resinoid and soft rubber polishing. Chicago Wheel and Mfg. Co., 1101 W. Monroe St., Chicago.

11. Ram Type Automatic Turret Lathes are covered in recent booklet. Functions necessary are controlled by the electrical and hydraulic or air circuits of the Lynn drive unit. Any desired feed may be provided for each station. A choice of any four of twelve spindle speeds can be made for any turret face. Jones & Lamson Machine Co., Springfield, Vt.

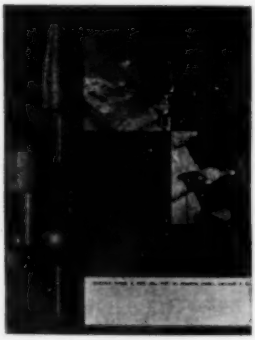
12. Hob Ground Milling Cutters cut twice the metal in half the time, according to folder from W. C. Chapman & Son, Inc., 4705 Erdman Ave., Baltimore 5, Md. Some milling advantages claimed: 1. Deflection is practically eliminated, regardless of flute length. 2. Depth of cut is considerably increased. 3. Heavier feeds are used—often doubled in some materials. 4. Horsepower required is cut in half.

13. Parts Marking Machines. Hand and power operated machines are presented in Bulletin No. 111, the Acromark Co., Elizabeth, N.J. Mark parts of any shape made of steel, other metals, and plastics.

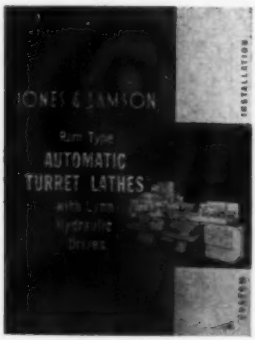
14. Padded Shipping Bags. Flyer pictures Jiffy shipping bags reinforced with fiber mesh. Will withstand rough handling. May be used to ship products usually considered too dense and heavy for bag packaging. Jiffy Mfg. Co., Hillside, N.J.



(See Number 9)



(See Number 10)



(See Number 11)

Can parts this small be barrel finished?

Dime shows tiny size of typical bearing races.

Twin-barrel ALMCO Supersheen Model DB0-1A used by Miniature Precision Bearings to process the tiny bearing assemblies.

EMPHATICALLY, YES! For example, precision deburring and finishing of small parts with ALMCO barrel finishing equipment is an important operation at the modern new plant of Miniature Precision Bearings, Inc., Keene, N.H.

M.P.B. makes miniature ball bearings, some with assemblies so tiny that 500 can be carried in a thimble. ALMCO precision equipment and methods are used to improve surface finish on the inner and outer races, as well as removing burrs, sharp edges and machining lines.

Production usually runs 1,000 to 4,000 parts per load, and occasionally 5,000 to 15,000. All told, millions of parts yearly are finished the ALMCO way at Miniature Precision Bearings!

If you have finishing problems with your parts, small *or* large, perhaps ALMCO has the answers. It's easy to find out. Just write on your letterhead asking for an ALMCO sales engineer to call. Or, if you prefer, send sample parts and specifications desired direct to ALMCO's main lab at Albert Lea, Minnesota.

SEND FOR FREE 52-PAGE HANDBOOK

Tells all about modern precision barrel finishing processes. Facts, photos, data and cost comparison charts.

ALMCO

QUEEN PRODUCTS DIVISION

KING-SEELEY CORP.

42 E. Main St. • Albert Lea, Minnesota

Sales and Engineering Offices in Chicago, Detroit, Los Angeles, Newark, New Haven, Philadelphia

IN ENGLAND: *Almco Division of Great Britain, Ltd., Bury Mead Works, Hitchins, Herts, England*

Use postpaid card. Circle No. 287

Free Literature

continued

15. Filters for Compressed Air and other gases are described in booklet which discusses several single tube models for operating pressures from below 125 psi up to 4000 psi, and flow rates as high as 800 scfm. Multi-tube models shown. Commercial Filters Corp., 2 Main St., Melrose, Mass.

16. Fluid Transfer Glands. Literature available describes the DuCas fluid transfer glands which are said to operate at zero leakage even when run at speeds up to 15,000 rpm and pressures up to 1500 psi, requiring only 1.3 hp to operate. DuCas Corp., 1117 Douglas Ave., Providence 4, R.I.

17. C-Frame Presses. Bulletin 58-CPA covers four new automatic models of the H-P-M C-frame, including automatic, automatic with electrical controls, automatic with hydraulic interlock and the same with electrical controls. Three sizes available—two bench and one floor type through 15 ton cap. The Hydraulic Press Mfg. Co., A Div. of Koehring Co., Mt. Gilead, Ohio.

18. Gage and Setting Fixture. Information on operation, application and cost of the No. PG-800 gage and the No. PG-400 setting fixture are contained in Bulletin SSC-B1. Setting fixture can be used to set the gage to dimensions of ½ tenths (.000050") without the use of masters, rings, or setting blocks. Dept. B-20, Sunnen Service Corp., 7900 Manchester, St. Louis, Mo.

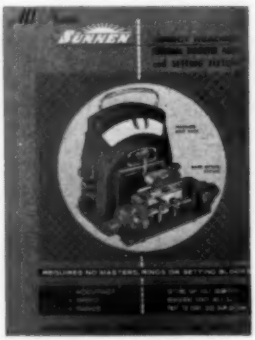
19. Barrel Finishing Equipment. Bulletin 255 describes the Vibraslide barrel finishing machine. While the barrel is rotating a vibrational force in the barrel itself allows the finishing work to be done in less time than previously necessary, with no damage to the parts being finished. Metal Finish, Inc., Newark, N.J.

20. Dowel Pins. Price list gives features of S. & A. dowel pins, e.g., extremely hard surface; precision-ground to very close tolerance limits; surfaces treated with a rust preventative; core of sufficient hardness to overcome any "mushroom" tendency when pins are driven into a tight hole. Schultz & Anderson Co., Newark 5, N.J.

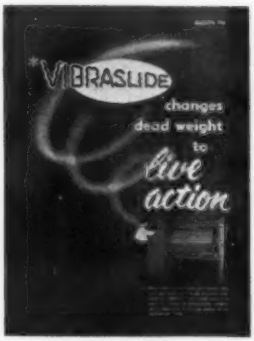
21. Microhardness Tester permits direct, accurate readings, corresponding to Vickers, within 15 seconds by measuring resistance hydrostatically. Eliminates a microscope, conversion charts and complicated tables. Bulletin from Newage Industries, Inc., 222 York Rd., Jenkintown, Pa.

22. Ultrasonic Cleaner. A new data sheet is available on the giant size Series 500 Narda SonBlaster ultrasonic cleaner. It is the largest capacity (up to 70 gallons)

(See Number 17)



(See Number 18)



(See Number 19)

WE TAKE OUR OWN MEDICINE!

202 Hammond Machines in use in our plant

- Abrasive Belt Grinders
- Carbide Tool Grinders
- Mist and Duskolectors
- No Dust—Wheel Grinders
- Polishing and Buffing Lathes

Every worker has power units nearby for fast grinding, polishing and deburring.

Write for catalog today

Hammond Machinery Builders INC.

1614 DOUGLAS AVE. KALAMAZOO, MICHIGAN

Use postpaid card. Circle No. 288

Free Literature

continued

mass-produced ultrasonic cleaning equipment available, the manufacturer claims. Narda Ultrasonics Corp., Westbury, L. I.

23. Milling Attachment. Literature describes the new Model 120 full power vertical milling attachment with infinite feed and infinite speed. Rusnok Tool Works, 4840 W. North Ave., Chicago 39, Ill.

24. Surface Grinding Machine. Bulletin covers specifications of the new Model 618 Micromaster surface grinding machine designed for rapid production of highly accurate surface grinding of small and medium-sized work. Brown & Sharpe Mfg. Co., Machine Tool Div., Providence.

25. 8-Ton Punch Presses. Flyer illustrates the strong frame, sturdy ram, strong crankshaft and dependable tripping of this press, Model 8-R. Throat depth of 12¾" provides a bolster area of 11¼"x 16¼". A die space of 10¾" permits use of large die sets. Kenco Mfg. Co., 5211 Telegraph Rd., Los Angeles 22, Calif.

26. Precision Instrument Lathes. Catalog T announces an additional line of lathes made with enclosed head stocks, vee belt drives and tubeless speed control. Spindles are made for collets with either 3/16" or 5/16"cap. Motor control provides speed changes from 0 to 4000 rpm. Louis Levin & Son, Inc., Los Angeles 7.

27. Packaged Water Chillers. Smaller size, lighter weight and reduced cost are features claimed for the Acme Model DE packaged water chiller described in Catalog No. 534. Sizes range from 20 through 125 tons. Acme Industries, Inc., Jackson, Mich.

28. Solution Type Cutting Fluid, especially designed to replace cutting oils on heavy duty operations, is described in bulletin entitled "Cimcool Cimperial." It explains the features of this new chemical solution and also contains a chart of recommended dilutions. The Cincinnati Milling Machine Co., Cincinnati 9.

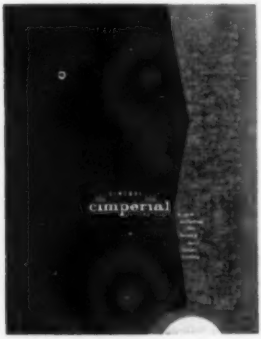
29. Pneumatic Marking Machine, No. 259, is described in folder as having fully open construction and ample work space. The unit can be operated with rotary feed table or in automated line. Specs.: die space, 8"; table size, 5"x16"; speed, seventy 1" strokes per min.; max. pressure (at 100 lb. line pressure), 2800 lb. Cadillac Stamp Co., Cor. Ryan & Nancy, Detroit 12, Mich.

30. Wet Abrasive Cut-Off Machine, Model 481, is reported in Bulletin DH-84 as cutting solid billets, pipe or structurals and any shape that will fit into an 8" circle or square. Hardened steel, titanium, high temperature alloys, corrosion-resistant metals can be cut 8 to 10 sq. in. per min. Allison-Campbell Div., Am. Chain & Cable Co., Bridgeport 2, Conn.

31. Metal Stampings. Booklet presents production facilities available for de-

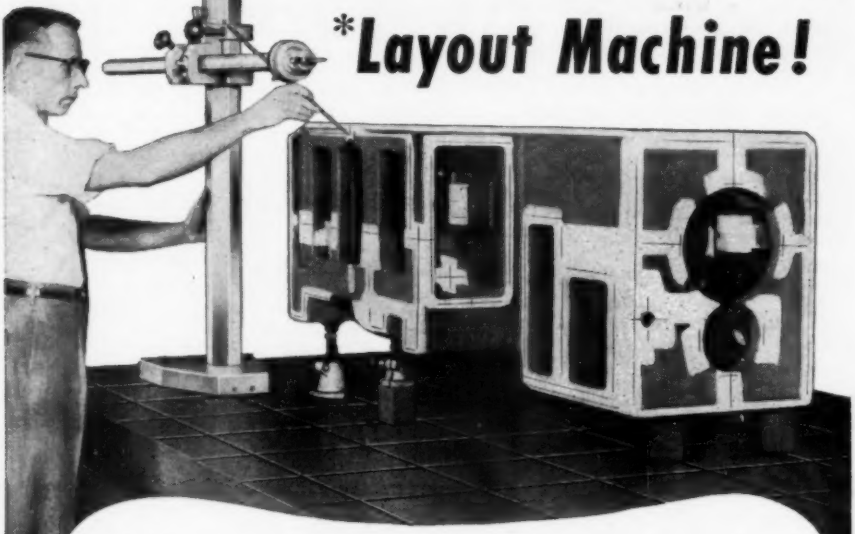
(See Number 26)

(See Number 27)



(See Number 28)

NEW . . . Revolutionary P.D.Q. *Layout Machine!



PORTAGE LAYOUT MACHINE DOES THE JOB UP TO 8 TIMES FASTER

Looking for a way to cut costs? . . . here is a dandy! For the very first time layout work can be accomplished from *five* sides . . . plus inside surface checks with only one setting of the casting. Hole centers, finish allowances and casting clean up is all done in one easy, accurate operation. Angle plates, squares and other hand tools are completely eliminated. The time normally taken up in repositioning hand tools is also eliminated. Write, wire or phone for literature and prices.

PDQ

PORTAGE Double-Quick, Inc.

1037 SWEITZER AVENUE • AKRON 11, OHIO

Use postpaid card. Circle No. 289

Free Literature

continued

burring, drilling, red skinning, plating, reaming, etc. Maximum blank size, 22 x 22 inches. Maximum thickness, ⅜ inch. Maximum blanking pressure, 300 tons. Dayton Rogers Mfg. Co., Minneapolis 7, Minn.

32. Malleable Castings Handbook furnishes an introduction to pearlitic malleable and is a ready reference to the latest information and data on this relatively new material. Charts contain information necessary to translate basic design needs into final pearlitic malleable specifications. Malleable Research and Development Foundation, Granville 1, Ohio.

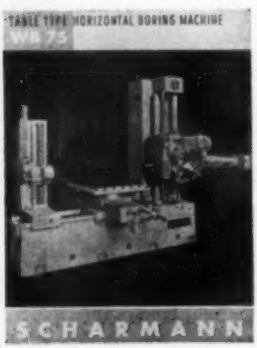
33. Hand Operated Impact Wrench, described in brochure, is said to multiply force 15 times for easy handling of high torque bolting jobs. Available in three models. Swenson Engineering, P.O. Box 43, Branford, Conn.

34. Gage Block Sets. Bulletin 8-3 covers briefly the types of gage block sets available from the Fonda Gage Co., Inc., Stamford, Conn.—rectangular and square, in steel and tungsten carbide. Bulletin 8-5 describes the need for and availability of gage block inspection. Two types of inspection service are described in this bulletin. Recalibration of working blocks includes cleaning, burr removal and a report on individual sizes and surface conditions.

35. Table Type Horizontal Boring Machine, Model WB 75, as described in recent brochure, features heavily ribbed box type bed with wide flat guideways; boring spindle nitrided, precision ground and lapped; automatic tool ejector. Specifications include: spindle dia., 3"; boring depth in one stroke, 21½"; work table, 28"x35½"; distance face plate to headstock, 63"; main drive two speed motor, 8 hp. Scharmann Machine Corp., 337 Blvd., of the Allies, Pittsburgh 22, Pa.

36. Throw-Away Insert Tool Holders. Catalog No. 581 describes a new line of throw-away insert tool holders which eliminate necessity for a separate chip-breaker. Catalog includes information on inserts in four different cutting materials —carbide, cast alloy, oxide, and high speed steel. The Viking Tool Co., 1000 Nichols Rd., P.O. Box 471, Shelton, Conn.

37. Heavy-Duty High Production Boring Machine, the Olofsson Model 22, engineered for both precision and heavier machining operations, is described in four-page bulletin. Design and operating features are covered in detail. Specs. include: table travel, 15" max.; rapid traverse, forward, 228" per min., return, 180" per min.; 1½ hp motor, 1800 rpm. The Olofsson Corp., 2727 Lyons Ave., Lansing, Mich.



(See Number 35)

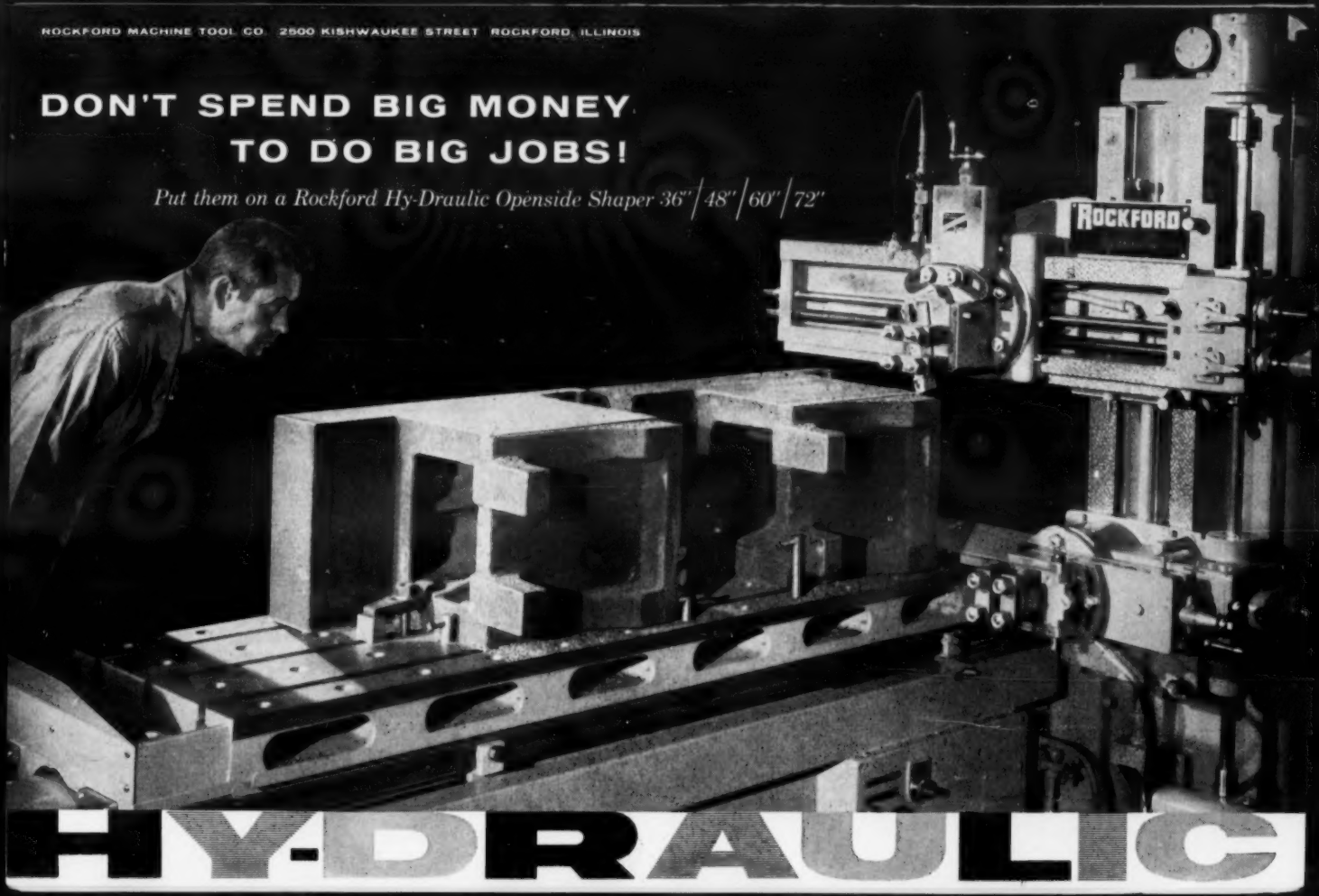
(See Number 36)

(See Number 37)

ROCKFORD MACHINE TOOL CO. 2500 KISHWAUKEE STREET ROCKFORD, ILLINOIS

DON'T SPEND BIG MONEY TO DO BIG JOBS!

Put them on a Rockford Hy-Draulic Openside Shaper 36"/48"/60"/72"



HY-DRAULIC

38. Vibrating Car Shaker. Data sheet gives description, data and specifications for the new Syntron-Sinex electromechanical vibrating car shaker. Application and operation, with dimensional layout, included. Syntron Co., 300 Lexington Ave., Homer City, Pa.

39. Transporting Motor Cargoes. Brief brochure describes the U.S.A.C. transportation service throughout the United States, for articles requiring custom handling. Branch offices are located across the country. A trailer can be built to fit the machine if necessary. U.S.A.C. Transport, Inc., 457 West Fort St., Detroit.

40. Special Purpose Electrode. Bulletin 7000.2 is a procedure guide for arc welding electrodes for hardsurfacing and for welding stainless steels, non-ferrous metals and cast iron. Each electrode—its properties and applications, how to use it—is discussed. Charts aid selection. The Lincoln Electric Co., Cleveland 17, Ohio.

interchangeable with all standard JIC cylinders

With the introduction of the ALL NEW T-J Squair Head, Tomkins-Johnson now offers industry the most complete design range of air and hydraulic cylinders. Presently available in bore diameters from 1½ to 8 inches, the T-J Squair Head is an interchangeable cylinder which produces maximum force and efficiency, with minimum pressures ... and is also adaptable to the use of low pressure oil as the working medium. Write today to Tomkins-Johnson, Jackson, Michigan, for Bulletin #SQ 10-58 and complete details.

CHECK THESE 10 POINTS OF T-J SUPERIORITY

1. One Piece Piston
2. Hard Chrome Cylinder Bore and Piston Rods
3. High Tensile Steel Tie-Rods
4. Cushion Adjusting Screw, Externally Adjustable
5. New Super-Cushion for air, or Self-Aligning Master Seal for Oil (T-J Patents)
6. Solid Steel Heads and Mounting Plates Standard all Models
7. Port Design Allows Minimum Pressure Drop on Inlet or Outlet
8. Chevron Type, Self-Adjusting Rod Packing
9. Piloted Packing Gland—Absolute Alignment
10. Piston Rod, Extra Strong—Polished and Chrome Plated for Efficiency and Protection

T-J TOMKINS-JOHNSON

Use postpaid card. Circle No. 295

When you "Put it on the Blanchard"

. . . be sure to use Blanchard Wheels

Your Blanchard Surface Grinder is designed to give you peak production and economy on hundreds of different grinding jobs. But, for every job you run, *there's one particular wheel that does it best!* That's why Blanchard manufactures and stocks a wide variety of silicate, resinoid and vitrified bonded wheels and segments.

Your Blanchard representative will be glad to help you select the wheel—or wheels—best suited to *your* grinding operations. Call or write him today. May we send you a copy of "The Art of Blanchard Surface Grinding" (4th Edition)?

THE BLANCHARD MACHINE COMPANY

64 State Street — Cambridge 39, Mass., U. S. A.

Use postpaid card. Circle No. 296

DoAll Sponsors Traveling Presentation

A traveling educational presentation, "The Cutting Edge," is the third program sponsored by the DoAll Co. to appear before engineering and technical groups across the nation. Over 50,000 people attended the first two. One of these is now part of the permanent exhibit of the Museum of Science and Industry in Chicago and the other is on display at the Hall of Progress in Des Plaines, Ill.

The present display shows the vital importance of cutting tools for the promotion of the American way of life in the space age. It consists of a 43 ft. historical panorama showing one million years of progress.

An illustrated lecture presents up-to-the-minute cutting tool principles, and an exhibit of acutal tools, workpieces, and technical data shows how manufacturers are meeting the demands for

Keen interest is shown by viewers of historical panorama, part of DoAll's traveling exhibit.

greater accuracy, tougher materials, and higher production. The presentation is under the direction of C. G. Schelly, director of educational research.

Each of the twelve panels of the panorama represents a plateau in man's application of cutting edges. The step-by-step evolution of the cutting edge from the sharp splintered bone of a million years ago to the modern tools of the jet age is clearly traced. For each age, actual tools and the goods they produced are displayed, together with color scenes of life at that time.

For a travel plan and schedule of bookings, write the DoAll Co., Des Plaines, Ill.

Gage Division Announced

The L. S. Starrett Co., Athol, Mass., has announced a new gage division with manufacturing, engineering and sales facilities to design and build complete special gaging equipment A staff of sales engineers will call on companies for direct assistance in their gaging problems or inquiries may be sent to the company marked for the attention of the Special Gage Division.

Lincoln Electric Pays Annual Incentive Bonus

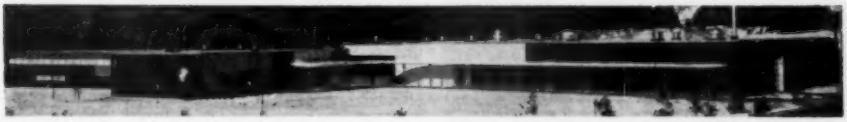
This past December, 1380 employees of the Lincoln Electric Co. shared a total $5,147,450 incentive pay bonus, marking the 25th anniversary of the first Lincoln bonus distribution. In 1934 the 398 employees shared $131,785.

Each person's share in the bonus is determined by an individual merit rating of his or her job performance. In addition to the incentive bonus, the company has also purchased retirement annuities for all employees each year since 1936. In 1958 the company spent $850,000 for annuities.

Since 1934, Lincoln employees have earned a total of $86,461,105 in cash bonuses and annuities in addition to their regular pay, which is said to be average for the industry in the Cleveland area.

Split Ballbearing Triples Capacity with New Plant

Split Ballbearing, a division of Miniature Precision Bearings, Inc., has recently completed the construction of a 34,000 sq. ft. plant which they describe as the "finest ever constructed for the manufacture of ball bearings." The new plant, constructed at Lebanon, N.H., at a cost of $600,000 will allow the company to triple its capacity.



Containing over 34,000 sq. feet of floor space, the plant consists of two buildings (office and factory) connected by a glass-walled lounge. Exterior walls are black glazed brick, glass panels, and anodized aluminum curtain walls with brighty colored panel inserts in red, blue and yellow.

Ultra-modern in appearance and equipment, the generous use of black glazed brick, clear glass, Thinlite glass panels, and aluminum curtain wall makes it one of the most colorful plants in New England. The building is carefully oriented on the site to take best advantage of the scenery of distant mountains, wooded hills and open fields. Windows and glass are so generously used that almost every employee has a view of this scenery from his work station.

Western Metal Exposition

Hundreds of metal firms have arranged to display their products, equipment and technique at the 11th Western

Metal Exposition March 16-20 in Pan-Pacific Auditorium, Los Angeles.

Technical sessions will be held by American Society for Metals, American Welding Society, Society for Nondestructive Testing and Metals Branch—Southern Section, American Institute of Mining, Metallurgical and Petroleum Engineers.

Congress programs will be sparked with new developments in metallurgical processes achieved over the past two years.

ASME Considers Problem of Educating Engineers

At the opening session of the annual meeting of the American Society of Mechanical Engineers, at the Hotel Statler Hilton, New York City, three specialists, including J. H. Westcott of the Imperial College of Science and Technology, London, England, discussed various approaches to the problem of the education of control engineers. Modifying conventional college curricula to fit the needs of the new field is complicated by the fact that knowledge required cuts across the conventional disciplines such as electrical, mechanical and chemical engineering.

L. E. Slater, of the Foundation for Instrumentation Education and Research, Inc., New York, said "Formal engineering education rests painfully today on the horns of a dilemma. On the one hand we have austere but relentless pressure from the academicians who rightfully insist that creative engineering relies on broadened programs of instruction in the basic sciences and humanities. On the other hand we hear the compelling siren songs of the new technologies which insist that our engineering colleges produce finely tuned specialists."

The program's third speaker, C. R. Otto, spoke on efforts to build an education program within the Instruments and Regulators Division of the American Society of Mechanical Engineers.

NMTBA to Move to Washington

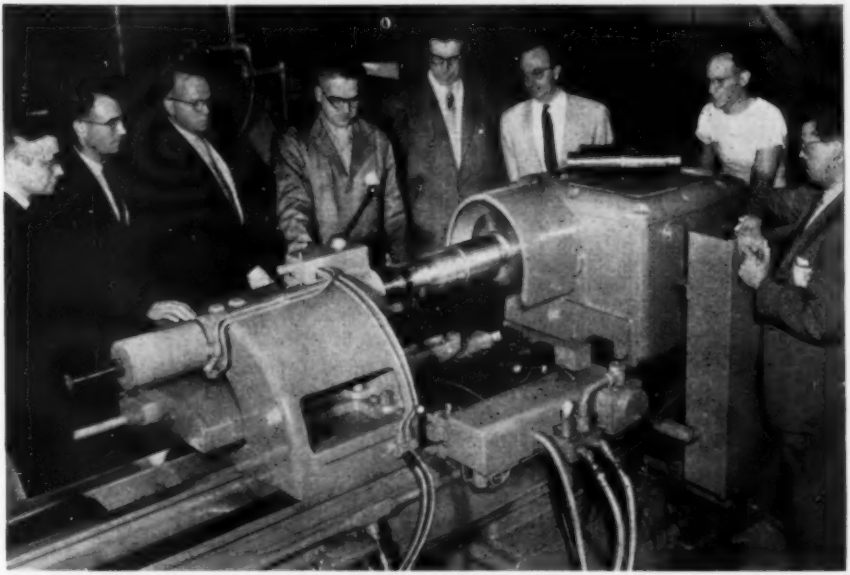
The National Machine Tool Builders' Association is planning to move its offices from Cleveland, Ohio to Washington, D.C., according to Ralph J. Kraut, president of the Association. Ludlow King, executive vice-president, said he was hopeful that a tenant for the Cleveland office could be secured in time for the Association to settle in new Washington quarters during the latter part of 1959.

The National Machine Tool Builders' Association is composed of 180 companies manufacturing machine tools, representing about 90% of the nation's machine tool building capacity.

Gisholt Holds Special Sales Conference

Gisholt Machine Co., Madison, Wis., has recently acquired United States distribution rights for the Cri-Dan semi-automatic, single point threading lathe. To acquaint the Gisholt sales personnel with the machines, a special sales conference was recently held at the company's plant. The effectiveness of the conference was enhanced by the presence of Yves Castelli, president of the Cri-Dan Co. of Paris, France, and also D. Howdle, the Cri-Dan representative in England.

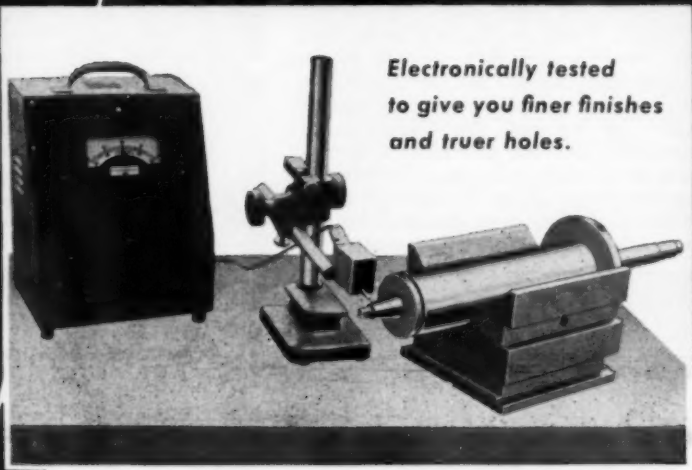
Basic machine features are said to include: better quality threads through the use of single point carbide tools; faster cutting speeds; ability to cut material of greater hardness, and the ease of performing multiple start threading operations.



In addition to the talks and discussion sessions, those present witnessed thread cutting demonstrations on Cri-Dan lathes, Models B and E, operating in the Gisholt testing department. Shown here (left to right) are: George Morris, Gisholt representative in Philadelphia; D. Howdle, Cri-Dan representative in England; Arnold Pedersen, Gisholt chief Cri-Dan engineer; William Jahn, Gisholt demonstrator; Yves Castelli, president of Cri-Dan, Paris, France; R. H. Stebbins, Gisholt assistant sales manager; Earl Carpenter, Gisholt serviceman, and C. J. Baxter Jr., Gisholt representative, Los Angeles.

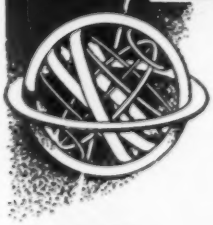
accent on Accuracy!

Whitnon PRECISION SPINDLES



Electronically tested to give you finer finishes and truer holes.

It's the accent on accuracy, too, that enables this gyroscope to keep perfect balance . . . any place . . . any time.



It's the *accent* on *accuracy*, also, that enables this dynamic electronic tester to help build perfection into every Whitnon Spindle. Measuring variations to 0.000010" it checks every Whitnon Spindle after assembly . . . to assure the absolute dependability and balance that turn your jobs out faster, more economically and more precisely.

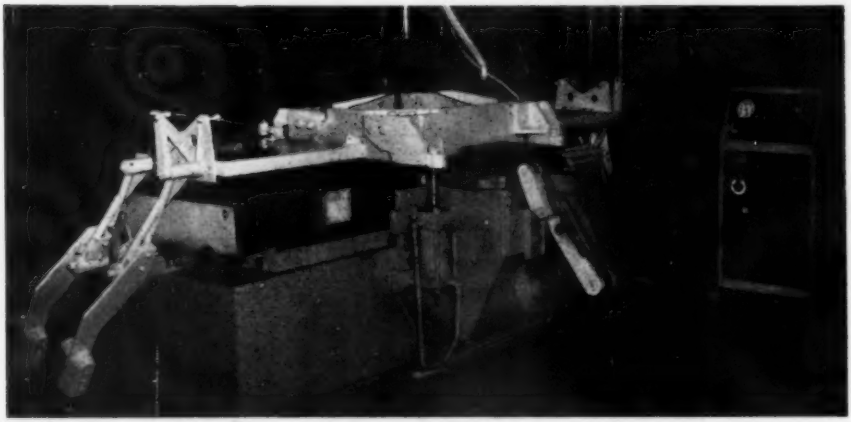
Proven precision like this . . . plus proven Whitnon quality . . . make Whitnon Spindles your best buy for any spindle operation.

WRITE FOR LITERATURE TODAY.

SPINDLES for GRINDING - BORING - MILLING - DRILLING

THE Whitnon MANUFACTURING COMPANY
ROUTE 6 AND NEW BRITAIN AVE, FARMINGTON, CONNECTICUT

Use postpaid card. Circle No. 300



Hot Forming Titanium Sheet Parts At Chance Vought

DALLAS—An automatic titanium hot forming press designed and developed by Chance Vought Aircraft speeds up time required to size and stress relieve parts for Crusader fighter aircraft.

Almost the entire tail section of the F8U-1 and F8U-2 planes in production at the plant are made of titanium sheet. This includes outside skin, frames, stiffeners, angles and channels inside.

The old system of hot sizing and stress relieving titanium parts was slow and required considerable hand work preparing the operation on the "pants pressers." With the new automatic machine, all the operator does is place the parts on the dies and remove them after the operation is completed.

The Vought machine consists of two 18″ x 34″ electrically heated dual traversing, platens and a third platen on top which exerts downward pressure of 30 tons in a six-inch stroke. Two horizontal rams with 9¾″ stroke can exert 25 tons pressure against the dies from the sides. Dies up to 34″ long, 6″ thick and 18″ wide can be accommodated in the machine.

Since it has two heated platens, the operator can be loading or unloading one while the other is in the press. Automatic controls move the dies and part into position and lock the rams into position for from one to 60 minutes.

continued

A special high heat strength alloy developed for Vought is used to heat the titanium parts. Movable insulating pads hold the heat in until the platen is moved into the press. • • •

Air Clamping Holds Wing Beams on Keller Profiler

● Conversion of a Keller three-spindle profiling machine, substituting air clamping of heavy aircraft wing beams for manual clamping, brought Chance Vought Aircraft a 40 percent saving in time required for the operation.

The 200-pound forgings formerly were held in place for profiling by wrench-tightened clamps. Vought tool designers developed a system of air clamps operated by five air valves which make quick work of a time-consuming job.

The 11-foot long aluminum alloy forging is held in place by 17 air clamps which can be tightened or released by turning a hand valve, color coded to match the clamps. The tool allows the operator to move certain clamps as required to permit cutter travel without stopping the operation.

The tool is designed to machine the inboard, outboard upper and lower surfaces of both the left and right hand beams. This eliminates necessity of using a left and right hand tool since only the template needs to be changed.

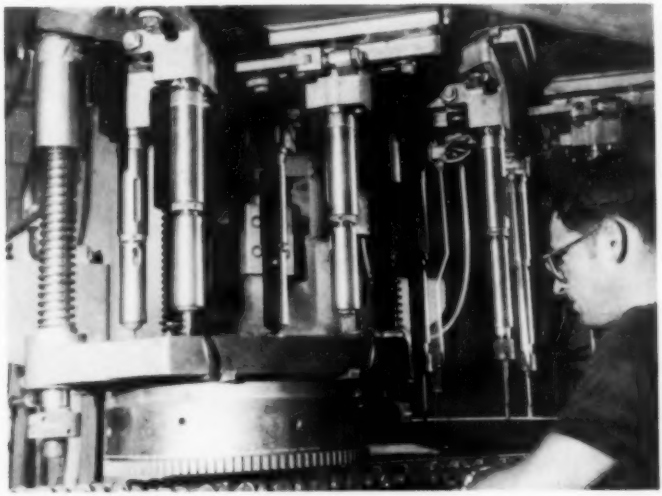
The self-contained clamping system was designed into the machine and the complete unit can be removed readily to permit milling of other parts. The clamps are operated by a two-way air cylinder using standard shop line pressure of 90 to 100 p.s.i.

The clamp operates in a spiral slot in the clamp post which gives it a 90 degree movement about the center line of the post.

A safety mechanism is also included by using check valves and a pressure switch. Should line pressure drop below a safe level, a flashing red light calls the operator's attention to the change. • • •

Each wing beam on Keller machine has its own set of clamps and actuating levers. Each handle is painted a different color, keying it to certain clamps for quick identification by the operator. Whole lever assembly can be removed when another type of operation is being done on the profiler.

continued



Drilling diesel flywheel on Natco adjustable spindle machine at Cummins.

Drilling and Tapping Diesel Truck Engine Flywheels

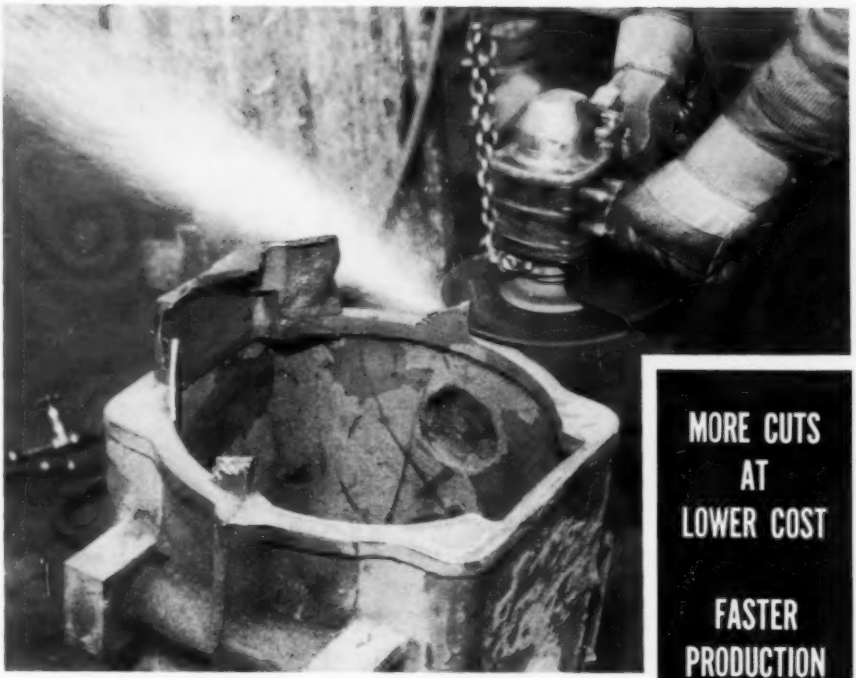
COLUMBUS, IND.—Cummins Engine Company, Inc., of Columbus, Indiana uses an adaptation of a standard vertical adjustable-spindle machine to drill and tap diesel truck engine flywheels of various sizes more economically. Formerly, a radial drill was used.

Spindles on the Natco machine may be adjusted to drill or tap any bolt circle between 14¾ inches and 18¾ inches in diameter, and containing four, eight, 12, or 16 equally spaced holes. Adjustments are made for spindle locations by turning a handwheel. Drill and tap spindles are located simultaneously. Spindle feeds and feed rates also change automatically.

The part is loaded on a 24-inch rotary table. For four holes, only one drilling cycle is required. Eight or more holes are obtained by indexing the part, after which it slides to the tapping position, where the cycle is repeated. For unloading, it indexes back to the drilling position. All of these functions are automatic.

Spindles are 2⅛ inch nose adjusting, to permit pre-setting of tools. Tapping utilizes Natco's double floating tap holders which permit tapping at different pitches and compensates for any variation between the hydraulic feed of the head and the lead of the taps.

The machine, built by National Automatic Tool Co., Inc., Richmond, Indiana, has a 22 x 38 inch rectangular head with 24 universal joint drives. Half of the head is used for drilling, the other for tapping. • • •



MORE CUTS AT LOWER COST

FASTER PRODUCTION

GREATER SAFETY

CUSTOM-MADE FOR YOUR JOB

MANHATTAN
REINFORCED CUT-OFF WHEELS

Actual Field records show up to 25% increase in cutting efficiency and cleaning room production with Manhattan Reinforced Cut-Off Wheels. That's because these wheels are specially designed to take the abuse of heavy cutting in foundry operations far beyond the limits of conventional cut-off wheels. Manhattan Reinforced Cut-Off Wheels are reinforced *two* ways. First, special fibers in Manhattan's bond increase by 50% the wheel's strength to withstand destruction by centrifugal force. In addition, super-strength synthetic lateral reinforcement gives a degree of resistance to side-strain not possible with ordinary wheels. Double reinforcement adds up to double safety and protection from breakage, too!

Let a Manhattan sales engineer show you how to increase production efficiency . . . get "More Use Per Dollar" at your shop with Manhattan Reinforced Cut-Off Wheels and other types of Manhattan high speed, heavy duty wheels.

RMD66

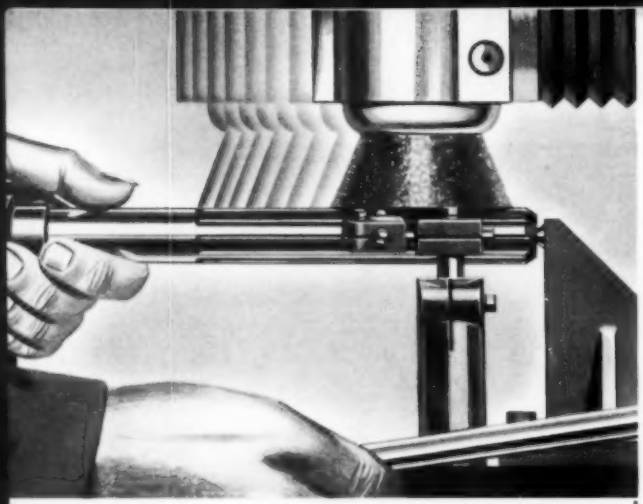
WRITE TO ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Belts • Hose • Roll Covering • Tank Linings • Industrial Rubber Specialties • Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Use postpaid card. Circle No. 291



OLIVER "ACE" TOOL AND CUTTER GRINDER

Traverses the wheel—not the work!

You can grind tools and cutters more accurately with the Oliver "ACE" because the wheel is brought to the work, reversing the usual process. Abrasive dirt and grit cannot cause wear because the cross carriage is not in motion. The horizontal ram which supports the grinding head is fully enclosed—sealed against dust and dirt. Further accuracy is assured because the wheel is trued by a stationary diamond which provides a fixed grinding line. It is not necessary to reset the cutter to compensate for wheel wear.

The "ACE" is a tool and cutter grinder designed expressly for tool grinding—not a general purpose machine adapted to tool room work. It is simple to set up. All angles are obtained by direct reading. Operators stand in a natural position with the control lever in easy reach and the work in direct view.

Face mills, reamers, end mills, staggered tooth cutters, slab mills, spot facers—all cutters straight or spiral—are quickly, easily and economically sharpened with the Oliver "ACE". Both standard and heavy duty models are extensively used for sharpening carbide-tipped circular wood saws used in both woodworking and metalworking.

Write today for complete information. We'd appreciate the opportunity of sending a quotation.

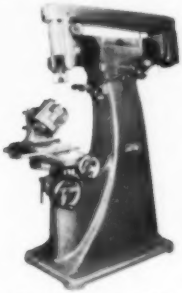
OLIVER of ADRIAN

1408 E. Maumee St. • Adrian, Michigan

DRILL GRINDERS AND THINNERS—TOOL AND CUTTER GRINDERS—AUTOMATIC AND MANUAL
FACE MILL GRINDERS—TOOL BIT GRINDERS—CONTOUR SAWING AND FILING MACHINES

HOW TO REDUCE YOUR CUTTING TOOL COSTS

Three elements are absolutely necessary if there is to be a substantial reduction in cutting tool costs—the right tool, the right geometry of grind on that tool, and the right machine to produce the grind. There are various machines which will always be most suitable for specific applications. However, for the average cutter grinder jobs, Oliver has pioneered a new approach to the problem with the introduction of the "ACE" tool and cutter grinder.



The Heavy Duty "ACE"

The cost savings are attractive with respect to both setup time and grinding time. Setup usually consists of two simple "direct-reading" adjustments. The first setting is made to produce the angular or straight line grind requirement. The second setting consists of tilting the grinding wheel spindle to produce the proper clearance—all extremely simple.

Grinding time is reduced considerably because tool travel is eliminated in most cases. Thus the time consists wholly of bringing the grinding wheel on and off the cutting tool. This compares extremely favorably with competitive grinding procedures.

This combination of easy setup and rapid grinding is found only on the economically priced Oliver "ACE" tool and cutter grinder.

There are two versions of the "ACE": the standard, which is suitable for high speed and light duty carbide grinding, and the heavy duty model which is designed for grinding tungsten carbide cutters and tools in all of their many forms.

continued

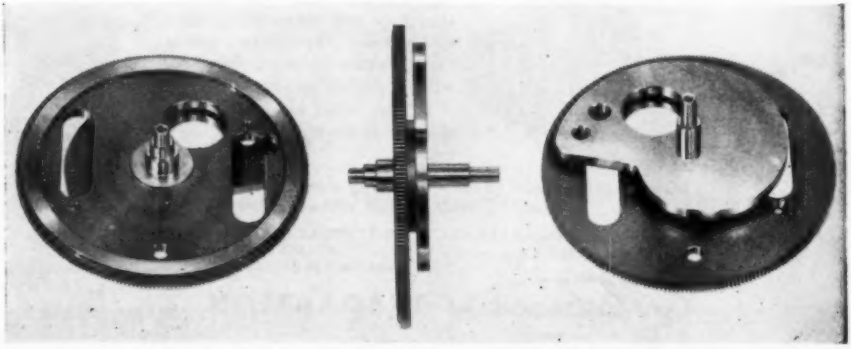
Machining Carbide-Faced Floor Tile Mixer Blades

SAGINAW, MICH.—Machine speed is the critical factor in machining this tungsten carbide faced Sigma blade—heart of a special mixer designed and built by the Chemical Division of Baker Perkins Inc. Biggest problem here is overcoming "flywheel" effect while finish turning the steel axles—to end up with true diameters, within 0.020-inch. Too much speed causes the engine lathe to vibrate, or tends to throw the work off-center. Operator, shown "miking" an axle, uses high speed steel cutting tools on the job, runs the machine between 34 to 50 rpm. The blade is for mixing asphalt floor tile and other similar abrasive materials. • • •

A Cam, Shaft and Gear—All in One Piece

DETROIT—A cam, a shaft and a gear—all in one piece—was manufactured by Eonic Inc. for Servomechanisms Inc. for use in their barometric altitude controller to be installed in aircraft and missile equipment.

The metal is 440-F Stainless. The open space between the cam and the



Views of cam, shaft and gear made from one piece of stainless steel bar stock.

continued

gear is .065″. There are 225 teeth in the gear, in a diameter of only 2-11/32″, with a pitch of 96. The tooth-to-tooth tolerance is .0002″, and the total composite error is held to .0007″. The cam tolerance is plus or minus .0001″, and it is held to a 4 micro-inch finish. The cam shown in the photograph was duplicated from a master cam made by Eonic, with a tolerance of .00005″ of the true print dimensions.

This cam was milled and ground on a special machine, which was designed, developed and built by Eonic.

• • •

SYNTRON Vertical Vibratory PARTS FEEDERS

Cut production costs

—by automatically orienting and feeding components in single line to assemble, machining, counting, packaging and other operations at instantly controlled rates. Their efficient high speed vibration permits the handling of even delicate parts.

SYNTRON Parts Feeders are easily adapted to tie in with automatic operations, as shown above. They can be fitted with gravity feed tracks with integral escapement mechanism, limit switches and/or counting devices.

SYNTRON Parts Feeders are accurate and dependable—there are no mechanical wearing parts therefore, downtime and maintenance costs are low. To cut production costs and have accurate dependable, rate controlled, automatic feeding of small parts call SYNTRON.

Write for FREE Catalogue Data

SYNTRON COMPANY
300 Lexington Ave. Homer City, Pa.

Use postpaid card. Circle No. 302

PUSH BUTTON *Speed Selection*

from  to  in seconds

or to *any* intermediate speed, *instantly*

Just push a button and watch the large tachometer dial on the headstock!

It's that easy!

The work is done by a motor driven speed changer. It accelerates or slows the lathe to any desired speed in seconds. With a 10:1 ratio, this new variable drive makes it easy to select from a wide range of speeds—200 to 2000 rpm in direct drive and 40 to 300 rpm in back gear.

Maximum stability and smooth power transmission are assured because the drive unit is oversized. All pulleys and shafts are fully supported (eight bearings). Double V-belts throughout the drive eliminate slippage and deliver full power to the spindle. Because of this rigidity and extra pulling power, this lathe will take heavy cuts at all speeds and precision finish cuts at high speeds.

It is a precision lathe, moderate in price, with the versatility for toolroom, production or second operation jobs.

SHELDON *Variable Speed* PRECISION LATHES

Illustrated
WM56P
13" Swing- 34" Centers
Base Price F.O.B. Factory
$2146.00
Less Chip Pan and Electricals
Also available with 11" Swing

Write for
"Variable Speed"
Circular and General
Catalog showing . . .

- 10", 11", 13" and 15" SHELDON Precision Lathes (Bench, Pedestal and Cabinet types)
- 13" and 15" SEBASTIAN Geared Head Lathes
- SHELDON Milling Machines
- SHELDON Back Geared Shapers

SHELDON MACHINE CO., INC.
4242 N. Knox Ave. • Chicago 41, ILL.

Use postpaid card. Circle No. 440

What's New in Metalworking

MACHINE AND TOOL blue book

Ultra-Precision Lathe Contours Dias. from 5" to 15"

The Monarch Series 180 chucking type lathe, intended for the O.D. and I.D. machining of thin wall spherical and related shape work pieces, contour traces to ultra-precision tolerances. The diameter range which may be contoured is 5" to 15".

The spindle is set at a 30° horizontal angle to the bed axis. Mounted on its own cast base, the infinitely variable D.C. drive is coupled to the spindle by a flexible coupling. There is constant surface cutting speed over a 6 to 1 ratio. Total speed is 8½ to 1000 rpm.

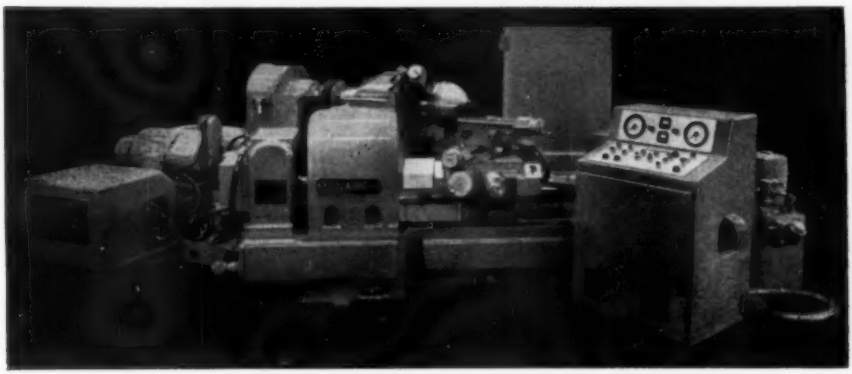
Bed ways are flame hardened and precision ground. The cross slide moves on large preloaded steel balls to minimize friction. Two tool adjusting slides permit tool adjustment both parallel to and at right angles to the spindle axis. An electro-hydraulic tracing system controls slide position within 20 millionths while tracing around a template.

Water cooling coils hold correct coolant temperature. Carriage feed is powered by a separate, infinitely variable motor drive through a multiple feed range gear box. Complete feed range is from .008" to 7.5" per minute.

Dogs and limit switches at the front of the bed provide an automatic work cycle. Electrical control of the machine is from a console which may be located convenient to the operator.

The Monarch Machine Tool Co., Sidney, Ohio.

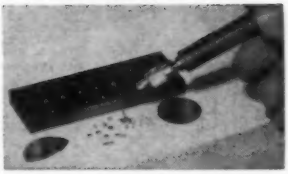
Use postpaid card. Circle No. 81



Lathe is designed for the O.D. and I.D. turning of thin wall spherical and related shape work pieces.

Tool Picks Up Fragile Parts Easily

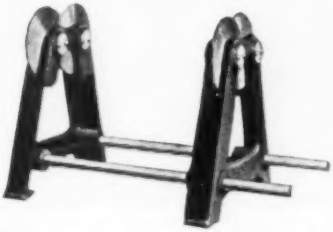
The Vac-U-Grip tool handles smallest size parts easily and accurately. A foot-operated switch controls the valve which allows the operator to release suction when part is correctly positioned. The system can be furnished in single or double stations, each including Vac-U-Grip tools, interchangeable tips, solenoid valves, manifold, foot-operated switches, and necessary tubing and connectors. Carman Laboratories, P.O. Box 328, Bedford, Mass.



Foot-operated switch controls.
Use postpaid card. Circle No. 106

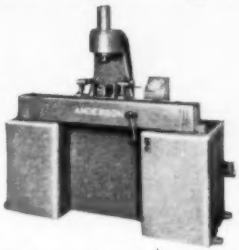
Anderson High Production Tools
CUT PRODUCTION COSTS

Precision Balancing Ways



Balance rotating parts easier, faster, more accurately. No leveling or centering required. Five sizes 20" to 96" swing, 1000 to 20,000 lbs. Precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings.

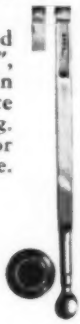
Hydraulic Straightening Presses



Straighten and check in same location with both speed and accuracy. Available with either traveling or stationary ram, power or hand operated in capacities up to 10, 25, and 50 tons. Can straighten to within .001."

Improved Hand Scrapers

Both high-speed steel and carbide-tipped blades in 18", 20", or 22" lengths. Light in weight, easy to use, reduce need for costly regrinding. Rubber bumper available for comfort and convenience.



Anderson Power Scraper

Power Scraper has a "natural hand control." Forward stroke can be regulated from ¼" to 3½ feet at 60 feet per minute. Portable, may be plugged into any electric outlet.

Anderson

Write for Bulletin No. 2-5

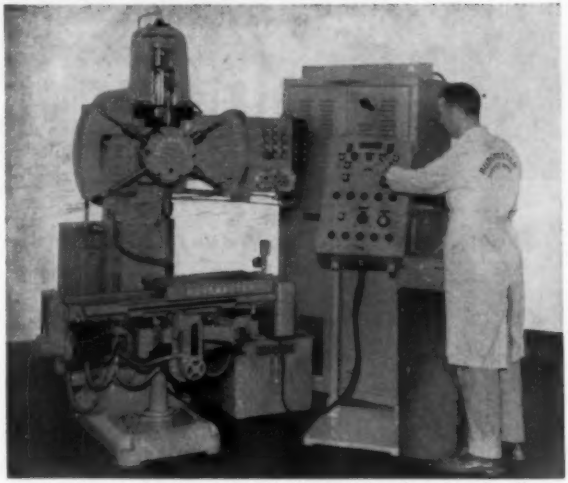
ANDERSON BROS. MFG. CO.

ROCKFORD, ILLINOIS

Use postpaid card. Circle No. 305

G.E. Tape Control Provides Flexibility On Turret Drilling, Tapping & Boring Machines

Short production runs of many different parts can now be machined on the fully automated Burgmaster turret drills. Setup from one part to another is reported as exceptionally fast, utilizing only simple holding clamps and standard tools. Punched tapes are quickly corrected, eliminating expensive tool rework in case of design changes, it is claimed. There is great accuracy of hole location—automatically controlled to ±.001", repeatable to ±.0005" without bushings—according to the manufacturer.



Numerical control system automatically controls all machine functions.

The Burgmaster G.E. numerical control system is an automatic punched tape control system for positioning the table on two axis and operating the

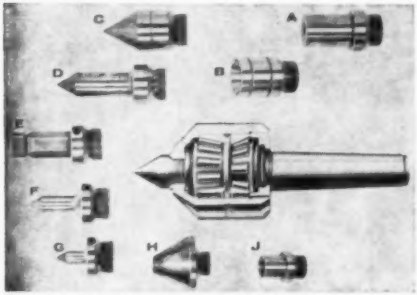
hydraulic turret drill to carry out a predetermined sequence of operations. These may include drilling, boring, tapping, reaming, counterboring, and spot facing. The control system automatically controls all the machine functions, positions the table, indexes the turret in any sequence, clamps the table in position while machining operations are being performed, and controls many auxiliary functions.

Burg Tool Manufacturing Co., Inc., 15001 S. Figueroa St., Gardena, Calif.

Use postpaid card. Circle No. 82

Live Center for Special Jobs, Small-Run Production

Machine shops and manufacturing plants faced with the problem of minimum tool allowance for special jobs or small-run production can tool up with minimum expense by using the heavy-duty Trio live center and making their



Representative group of special replaceable center points for use with new heavy duty live-center.

own special replaceable center points.

Ruggedly built, the unit has the same tapered roller bearings as on heavy-duty machine tool spindles. With a simple change in center points, it can be used for many different jobs since it is built to absorb extreme thrust and heavy radial loads without vibration or chatter. It turns with the work regardless of how tight it is set and needs lubrication only once a year.

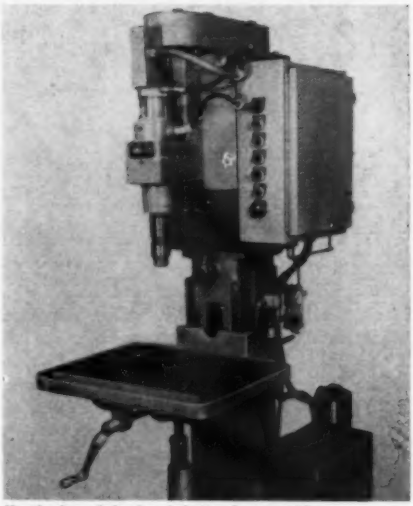
Trio Machine & Mfg. Co., 35700 Vine St., Willoughby, Ohio.

Use postpaid card. Circle No. 83

Vertical and Horizontal Tapping Machine

Model 25-20 tapping machine, adaptable for both vertical and horizontal tapping, has a ¾" capacity, 10 N.C. tap in mild steel.

Tapping speeds are available from 190 rpm to 1200 rpm. It has electrical operated lead screw safety for protection of the machine.

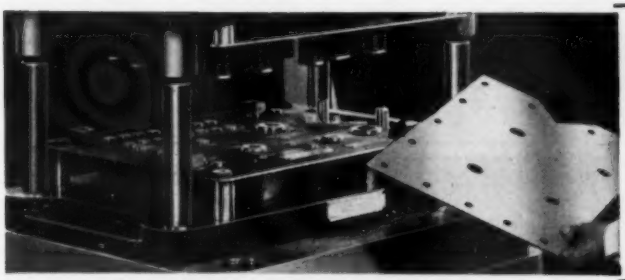


Vertical and horizontal tapping machine.

Kaufman Mfg. Co., Manitowoc, Wisconsin.

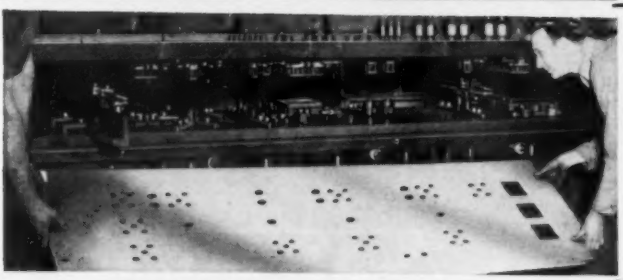
Use postpaid card. Circle No. 84

OVER 2700 PLANTS are saving money with WHISTLER DIES



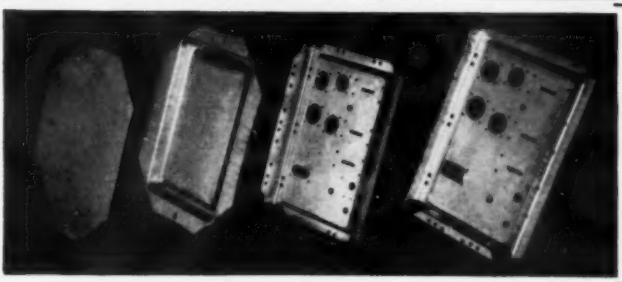
MAGNETIC PERFORATING DIES

All parts reusable and interchangeable. Punches and dies stocked in .001" increments from .100" thru .500". dia. Larger sizes available.



ADJUSTABLE PERFORATING DIES

All parts reusable and interchangeable. Punches and dies stocked in .001" increments from .100" thru .500" dia. Larger sizes available.



manufacturer of all types of

CUSTOM DIES

for over 40 years

WRITE FOR COMPLETE DETAILS

S. B. WHISTLER & SONS, INC., 746 Military Rd., Buffalo 23, N. Y.

Mail the following: ☐ Magna-Die Catalog ☐ Adjustable Die Catalog
☐ More information on custom die work

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

Use postpaid card. Circle No. 311

Optical Polygons, With 3-72 Faces

The principles of this single block optical unit, developed and approved by American and international standards institutions, have resulted in the most accurate and permanent angle master, the manufacturer claims. It provides circular spacing data independent of centering. The polygon method is said to provide results to .1 second of arc. Three to 72 faces are available.

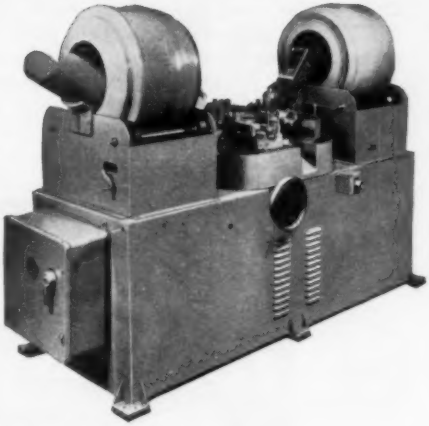
Engis Equipment Co., 431 S. Dearborn St., Chicago 5.

A ten-sided polygon, 1¾" dia., placed for comparison on top of a 12" 72-sided polygon.

Use postpaid card. Circle No. 84

LOWEST COST FASTENER PRODUCTION
. . . . *FASTEST* SETUP TIME!

There are four famous Prutton Thread Rolling Machines. Model 125A rolls threads on Screws, Bolts and Nails—handles sizes up to 5/16″ diam. and lengths to 3″ at speeds as high as 800 pcs. per min.; Model 20R, for profitable short runs to 5/16″ dia. and 2½″ lengths—at 200 pcs. per min. Model 300, for Special and Hollow Work—Class 3 Fit—produces 9,000 to 20,000 pcs. per hour.



SPECIALS—HOLLOW WORK

Many special sizes and shapes — solid and hollow work — can be produced on special Prutton Thread Rolling Machines. Unusual savings are possible, where parts, as shown in illustration, and others, are rolled on your Prutton.

Send complete details of your requirements for a proposal and estimate, today!

Prutton
CORPORATION
5295 WEST 130th STREET
CLEVELAND 30, OHIO

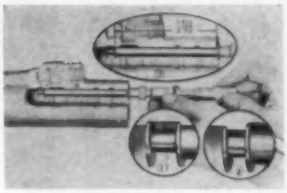
Remember

Prutton built the
FIRST
GREATER NUMBER
MORE VERSATILE
BEST PERFORMING
Planetary Thread Rolling Machines

Use postpaid card. Circle No. 313

Micrometer Caliper Measures Groove Widths

The Multi-Mike, a micrometer caliper, measures widths of grooves and lands, chiefly in interior sections where no previous gage could be used. Unit is 8⅞" long. Two discs, each .547" dia. and .025" thick, ground and lapped, form the jaws or measuring surfaces. Measuring cap. ranges from .050 to 1.050" for groove widths. Measures width of O ring and retaining ring grooves, etc. Consolidated Aircraft Products, El Segundo, Calif.



Micrometer caliper.

Use postpaid card. Circle No. 85

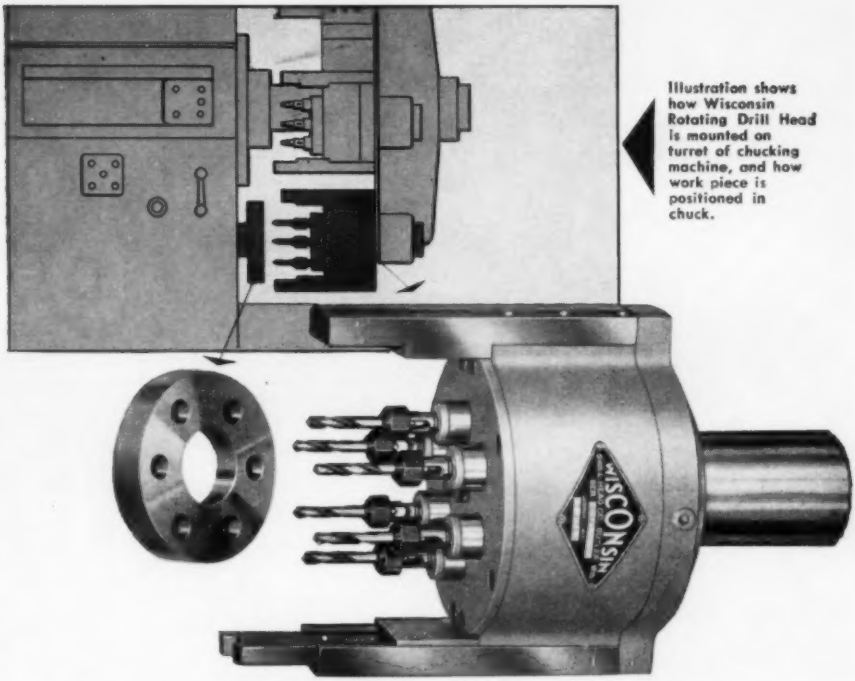


Illustration shows how Wisconsin Rotating Drill Head is mounted on turret of chucking machine, and how work piece is positioned in chuck.

WISCONSIN Rotating Heads for your Automatic Chucking Machines

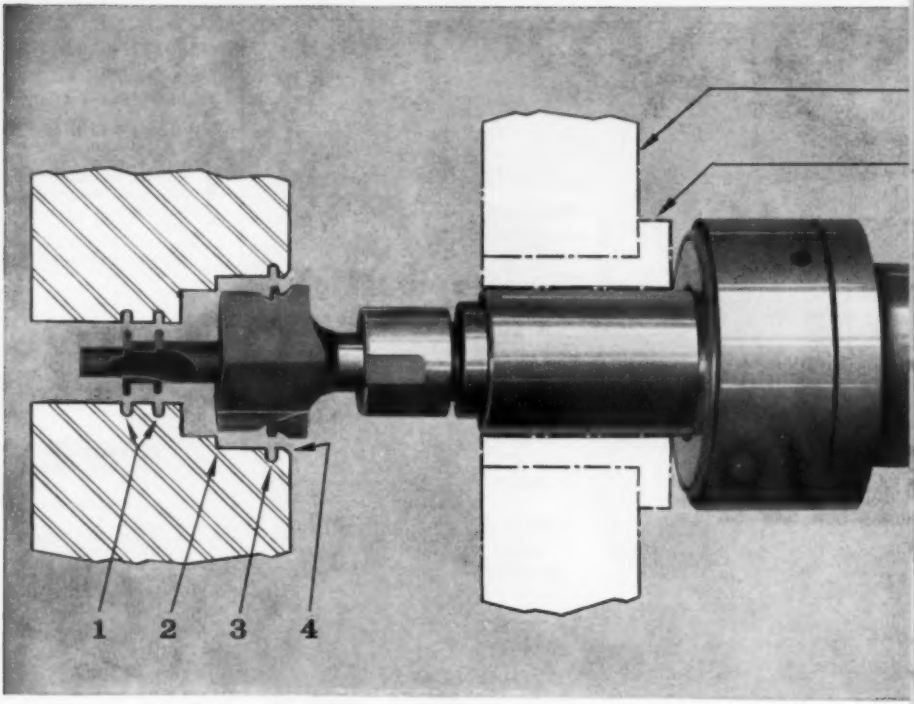
Rotating Drill Heads and Tapping Heads by Wisconsin are winning wide favor because of their efficient performance on popular makes of automatic chucking machines and lathes. If you have a drilling or tapping operation to perform at low cost, consider the application of one or more of these heads specially engineered to your specifications. The Wisconsin engineering staff is qualified by training and experience to assist you in tooling for high speed, low-cost production. Send your "specs" and prints for quotation.

Write for New Rotary Head Bulletin

WISCONSIN DRILL HEAD CO.

4981 NORTH 124TH STREET • BUTLER, WISCONSIN

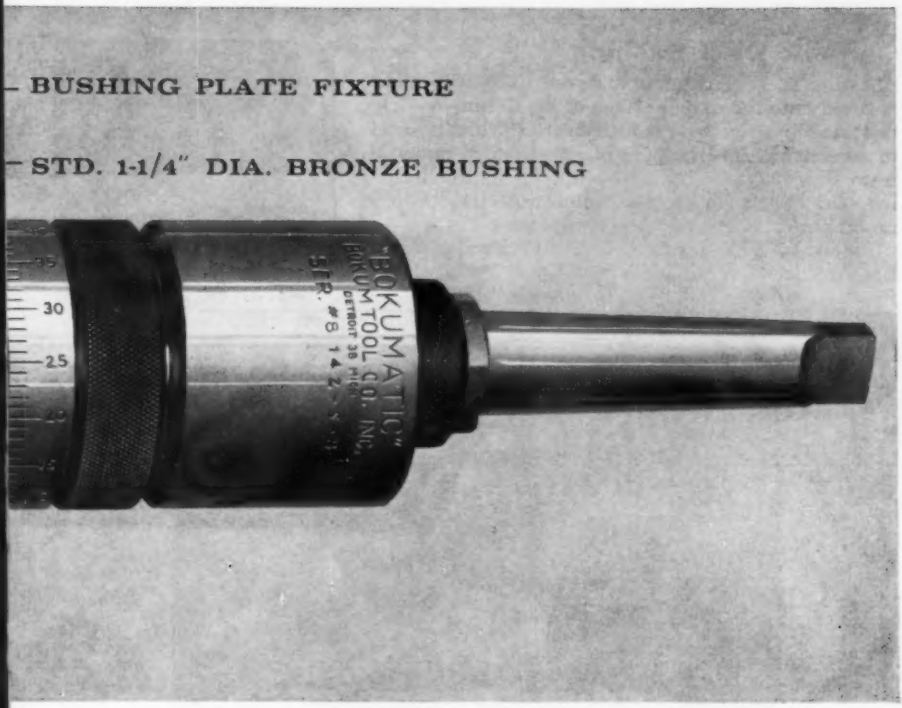
Use postpaid card. Circle No. 315



4 OPERATIONS ...1 PASS

Here is a typical job that Bokum solved with the Bokumatic Recess Tool Holder. The holder was piloted in a 1-1/4" bronze bushing plate for concentricity and completed the following operations in one plunge cut:

1. Two oil grooves–3/4" diameter.
2. Facing operation–1-3/8" diameter.
3. Beveled retaining ring groove–1-3/8" diameter.
4. Chamfer edge of part–1-3/8" diameter.



All of the above operations had various depths of cut from .060 to .096 per side. The job was done quickly with the Bokumatic holder and Bokum-designed special tools.

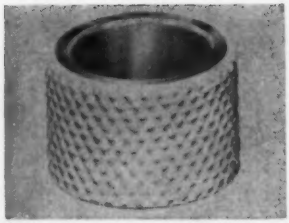
The customer took full advantage of the quick change adapter. Once the tool holder and the adapter were set, there was no need for the set up man to reset the job after each regrind of the tool. Tool set-up was done in the grinding room. You, too, can take advantage of the Bokumatic holder with Bokum special designed internal forming tools, or with Bokum standard "O" ring, retaining ring, back chamfering, and thread recessing tools. Write today for more information.

Ceramic Drill Bushing

A thin shell of ceramic material (.020-.030 thick) is fused onto the outer surface of the Ceram-A-Grip drill bushing, creating a heat barrier which is said to effectively insulate the plastic potting material from excess frictional heat build-up in the bushing. The bushing gives maximum protection, with a minimum sacrifice of close hole spacing.

American Drill Bushing Co., 5107 Pacific Blvd., Los Angeles 58, Calif.

Use postpaid card. Circle No. 86



Ceramic insulates against excessive heat build-up.

You never knew you could do so many things with MODERN ABRASIVES!

Say goodbye to many older, costlier metalworking methods

Today, use Brightboy, the modern finishing medium that will perform many types of work previously unrelated with abrasive uses.

Brightboy's wide scope begins where conventional abrasives leave off. Its unique working action results from rubber and Silicon Carbide or Aluminum Oxide abrasive grains working simultaneously; BURRING, CLEANING, FINISHING, POLISHING, in a *single-step operation!* Readily available STOCK grains and textures are JOB-MATCHED to *your job!*

WRITE US NOW FOR:

- SAMPLE BRIGHTBOY HAND TABLET
- CATALOG LISTING GRAINS, TEXTURES, MACHINE SPEEDS
- NEW METHOD RECOMMENDATIONS and for name of nearest Brightboy distributor

BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street • Newark 7, N. J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

WELDON ROBERTS
Brightboy
RUBBER CUSHIONED ABRASIVES

TIME SAVING FEATURES

Works to close tolerances
Can be shaped to contour
Produces conventional and special finishes and patterns, frequently the final polish
No before-use preparation or dressing
No skilled labor required

GENERAL USES

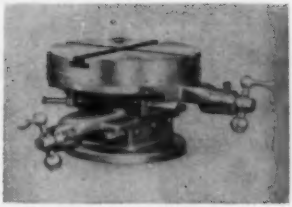
Removing light digs, tool and heat marks
Cleaning welded and soldered joints
Burring and finishing castings, stampings, machined and molded parts
Maintenance of tools and machinery

Use postpaid card. Circle No. 318

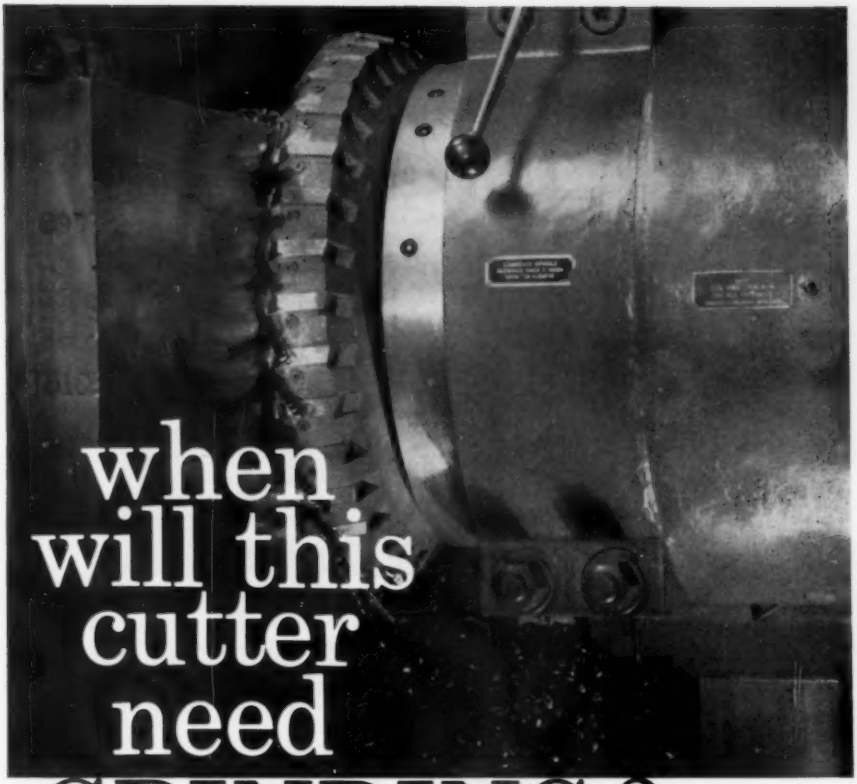
Improved Rotary Tables

New management and a year's reorganization finds the line of precision Mastercraft tools presenting the market with engineer improved rotary tables. Special features include rugged cast iron and steel construction, easy-to-read, finger-tip control dials calibrated in thousandths of an inch, 360° table rotations, and two feed motions at right angles. Mastercraft Engineering Co., P.O. Box 193, Arlington, Calif.

Use postpaid card. Circle No. 87



Features 360° table rotations and two feed motions at right angles.



when will this cutter need GRINDING?

When the blades get dull, of course.

But when is a cutter blade dull? At what degree of dullness does it begin to consume increasingly more horsepower and produce inferior finish? At what point does grinding prolong blade life?

Knowing *exactly* when to grind cutters is just one of the many variables that vitally affect performance and costs.

Our specialty is working with these variables—to furnish the most economical solutions to milling and boring problems, including grinding techniques, through the use of inserted blade cutters.

We study machine, work piece, feed rate, depth of cut, speed and finish requirements. And only after pooling this information with the customer's specialized knowledge of his own work is any cutter recommended.

We would appreciate the opportunity to tell you more about this unique cutter selection service. Write:

This helpful new booklet tells you how to reduce the cost of chips and improve your milling and boring performance. Ask for a free copy of booklet No. 68E.

THE
INGERSOLL
MILLING MACHINE COMPANY
CUTTER DIVISION
505 FULTON AVENUE • ROCKFORD, ILLINOIS

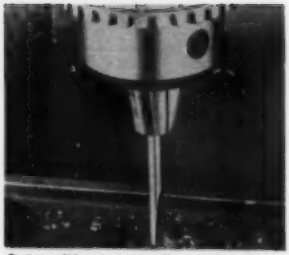
Use postpaid card. Circle No. 320

Drill Cuts 65 RC Hardened Steel

The Hi-Roc chip-cutting drill, which eliminates annealing and chance of distortion in hardened steel up to 65 RC, is solid carbide and features a job engineered drill point and special flute form. Consequently, the tool does not operate on the friction principle and heat damage to the work is removed, the manufacturer claims. A feed of up to 2" per minute in 60 RC material is reported.

M. A. Ford Manufacturing Co., Inc., Davenport, Ia.

Use postpaid card. Circle No. 88



Cuts without annealing, distortion.

Instrument Checks Surface Plates

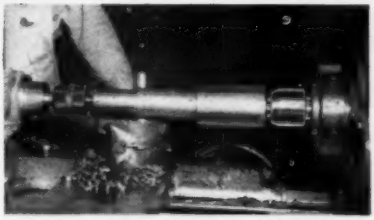
Tol-Check is a precision instrument for rapidly checking tolerance accuracy of surface plates. It does this by visually indicating any over-all tolerance deviations on a dial. There is no need for complicated graphs and paper work. Unit can be mounted on a rolling stand.

Herman Stone Co., 1860 N. Gettysburgh Ave., Dayton 27, O.

Use postpaid card. Circle No. 89

Unit on master surface plate.

New "Driving Center" Introduces Faster Machining Techniques on Work Held Between Centers



Eliminates Chucks and Clamps... Permits Full End-to-End Machining..."Loads" or "Unloads" without Stopping

Designed to increase both output and accuracy, the new Ideal Driving Center grips end face of work and eliminates need for chucks, dogs or other clamping devices . . . Work may be machined end-to-end without removal—usually can be loaded and unloaded without stopping . . . Rigid direct-drive action reduces backlash—prevents slippage—simplifies indexing on gear hobbers and mills . . . No preliminary machining needed; self-compensating pins grip and hold non-uniform work ends—even odd shaped pieces . . . 63 combinations fit maximum work diameters from ⅞" to 6⅜", in Morse tapers 2 to 6. Larger sizes may be had as specials.

MAIL COUPON FOR COMPLETE DETAILS

IDEAL INDUSTRIES, INC.

1441-B Park Ave.
Sycamore, Illinois

Please send me complete engineering data and selection chart for IDEAL Driving Centers.

Name .....

Company .....

Address .....

City..... Zone..... State.....

Use postpaid card. Circle No. 322

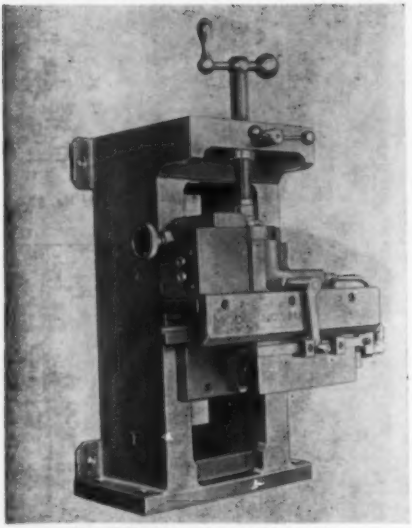
Hydraulic Marking Unit Mounts at Any Angle

A standard packaged unit for hydraulic roll marking is available as the Cadillac No. 58U, with or without hydraulic power unit, and also as the Cadillac No. 58 hydraulic marking machine, which incorporates the No. 58U mounted on Cadillac's standard base.

The power unit can be mounted at any angle, and at any location. Employing the roll marking principle, the compact 1 ft. sq. unit permits marking of parts while in a fixtured position on rotary feed tables, in-line transfer units, and other automated setups.

Specifications include: travel of slide (left to right), ¼" to 3½"; travel of head (up and down) 0" to ½"; maximum pressure, 8,000 lb.; die space, unlimited.

Cadillac Stamp Co., 17321 Ryan Rd., Detroit 12, Mich.

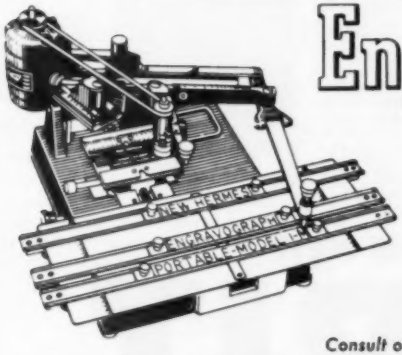


No. 58U hydraulic marking unit.

Use postpaid card. Circle No. 90

Are you **SAVING** through **ENGRAVING?**

YOU CAN mark parts, make signs and nameplates, improve your product and cut your costs in 1001 ways with the portable



Engravograph

It's tracer-guided for unskilled labor. Every plant needs one, wherever permanent lettering or numbering has to be done. There is a complete line of models to meet your application, from $298.00 up.

Consult our engineers on how ENGRAVOGRAPH can help your operation, or write on your letterhead for our 28-page fully illustrated catalog ***MM-2***

new hermes ENGRAVING MACHINE CORP.
13-19 UNIVERSITY PLACE, NEW YORK 3, N. Y.

Use postpaid card. Circle No. 324

Any Combination Fast/Slow Feed With Unit

Air-hydraulic unit combines an air cylinder, hydraulic control cylinder and specially-designed valve arrangement which allows rapid advance, feed and skip feed strokes in any combination. Latter operation is controlled by adjustable cams.

Made in sizes 2" and 3" bores, the unit is available in 2", 4", 6" and 8" stroke lengths.

The Electro Mechano Co., 261 E. Erie St., Milwaukee 2, Wis.

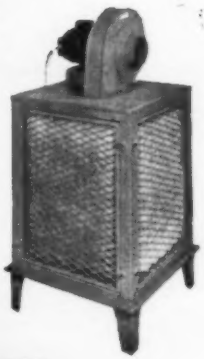
Use postpaid card. Circle No. 91

In 2", 4", 6" & 8" stroke lengths.

TORIT Mist Collectors *CONTROL* wet machining MIST

Wet machining operations produce floating fog and mist that could pollute the air in your plant. With the new Torit Mist Collector your men can breathe clean air and work in a safe, dry plant—while your maintenance costs go down! The new Torit Mist Collector filters out moisture through its spun glass filters—saves coolant that can be piped back into your cooling system. For full facts write today to... TORIT MANUFACTURING CO.

Walnut & Exchange Sts.
St. Paul 2, Minn. • Dept. **612**



THE NEW

TORIT MIST COLLECTOR

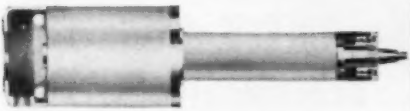
Use postpaid card. Circle No. 325

SEE FOR YOURSELF

why you can be sure of...

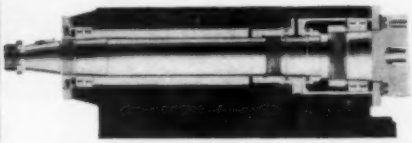
- **LOW MICROINCH SURFACE FINISHES**
- **TOLERANCES DOWN IN THE MILLIONTHS**
- **INCREASED PRODUCTION**
- **LOWER COSTS**

when you specify... **POPE PRECISION SPINDLES**



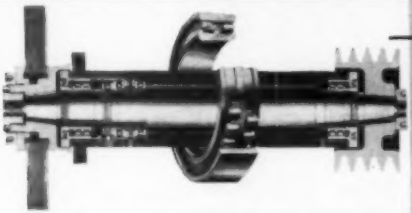
FOR SURFACE GRINDERS—

POPE 1, 2 and 3 HP, Totally Enclosed 1800 and 3600 RPM Motorized, Cartridge Type Spindles with massive shafts and big, double row cylindrical roller bearings having enormous capacity, superior performance and long life.



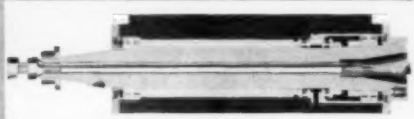
FOR BORING ROUND HOLES WITHIN MILLIONTHS OF AN INCH

POPE Heavy Duty Boring Spindles for smooth, chatter free, continuous high production of accurate parts. Again, look at the big cylindrical roller bearings and thrust bearings.



FOR CYLINDRICAL GRINDING—

POPE Cartridge Type and Wheel Head Belt Driven Spindles with the capacity to produce more work whether you plunge grind with a crush dressed wheel, remove surplus metal, or produce low microinch surface finishes. Note the super-precision radial bearings and ball thrust bearings.



FOR HEAVY DUTY MILLING—

POPE Spindles have the double row cylindrical roller bearings for the extra rigidity to support the cutting tool, and the double direction thrust bearings with the excess capacity to stabilize the shaft against endwise movement in either direction. This adds up to longer cutting tool life, more production, lower cost per piece.

POPE *engineers and builds standard and special, precision anti-friction bearing Spindles for every purpose. Send us your specifications for prompt quotations.*

No. 115

Specify **POPE** PRECISION SPINDLES

POPE MACHINERY CORPORATION
Established 1920
261 RIVER STREET · HAVERHILL, MASSACHUSETTS

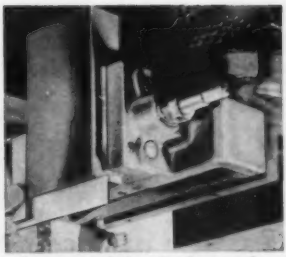
Use postpaid card. Circle No. 326

Attachment Squares Work Easily

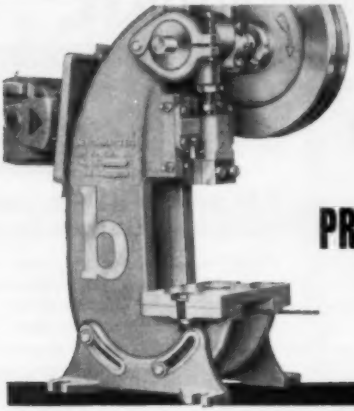
The Squarite attachment permits changing from length-wise to end-shaping pieces without adjusting the vise or table. As the unit clears the table, long pieces can be easily end-shaped to positive length. Finish grinding time is saved. Measurements of dimensions can be taken without removing work from vise. Jaw lengths from 10" to 15"; jaw openings 6" and 8".

Heinrich Tools Inc., Racine, Wis.

Use postpaid card. Circle No. 92



Square work by simply securing piece into vise attachment.



THERE'S A BENCHMASTER FOR EVERY PRESS OPERATION

at ratings from 2 to 10 tons!

Benchmaster gives you a series of proven presses and press designs—backed by 20 years of industrial use—with stock parts and dealers from coast to coast!

Benchmasters are the *accepted* presses — standards of the industry for all light tonnage applications.

Made in 2, 5, 8 and 10 ton capacities in Plain OBI, Back-Geared, Deep Throat, Fixed Bed Gap Frame, Multiple Ram and Half Press models with mechanical, air or electric clutches. Also available: Mechanical 2 hand trip lever or 2 hand solenoid operation for maximum safety.

When you need a press for *any operation*, check with Benchmaster . . . *known for service, for reliability . . . for over-all press versatility, and for low cost!*

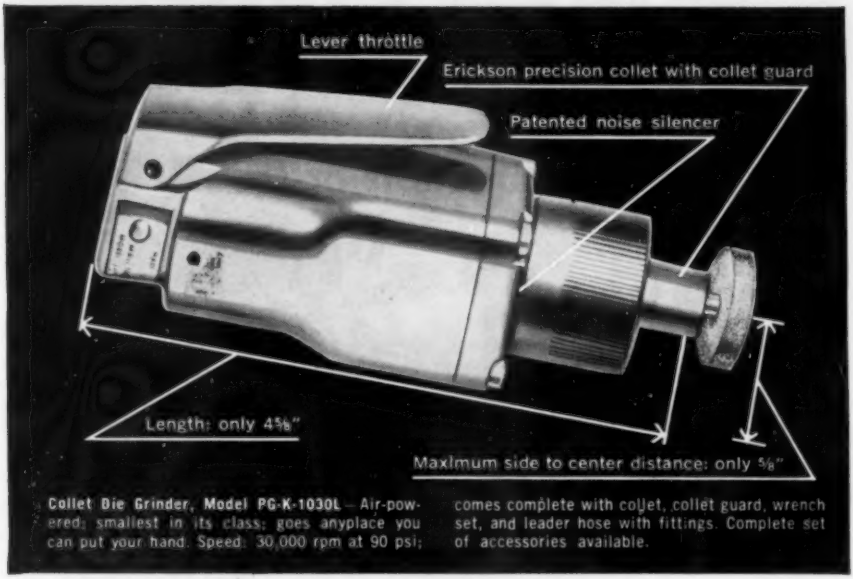
benchmaster

World's largest manufacturer of small punch presses and mills.

1835 W. Rosecrans Avenue • Gardena, California

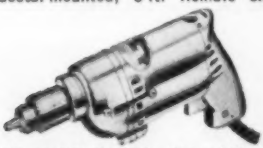
Use postpaid card. Circle No. 327

POWER to boost job efficiency with REMINGTON tools



Collet Die Grinder, Model PG-K-1030L — Air-powered; smallest in its class; goes anyplace you can put your hand. Speed: 30,000 rpm at 90 psi; comes complete with collet, collet guard, wrench set, and leader hose with fittings. Complete set of accessories available.

Flexible-Shaft Machine, Model 8FGP — 3-hp, extra-heavy, continuous-duty electric motor, totally enclosed; dust- and vapor-proof; pedestal-mounted; 6-ft. flexible shaft.



⅜" Electric Drill, Model 381— Heavy-duty, 2.5-amp., AC/DC motor; free speed: 800 rpm, geared for exceptional torque; compact design; wt.: 5 lbs. UL-approved.

Remington delivers mobility and all the power you need to help cut production costs. With Remington you can standardize on the industry's widest selection of power tools—air, electric or gasoline-driven—with parts and service from one source. For free booklet describing the complete line of Remington Contractor and Industrial Tools mail Readers' Service card or see your local Remington distributor.

Remington

Remington Arms Company, Inc., Bridgeport 2, Conn.
IN CANADA: Remington Arms of Canada Limited, 36 Queen Elizabeth Blvd., Toronto, Ont.

DUPONT

Use postpaid card. Circle No. 328

Taper Correcting Attachment

Gage Line, a taper correcting attachment, can be applied to the company's 4" to 14" plain grinders and all sizes of their universal grinders. It is employed primarily to obtain exact alignment of the swivel table. The attachment consists of two gage heads, one at each end of the table, and an electronic control unit conveniently mounted for the operator.

The Cincinnati Milling Machine Co., Cincinnati 9.

Use postpaid card. Circle No. 93

Obtains alignment of table.

NEW

a super-hard cemented carbide for
high speed, high precision machining of steel

CARMET CA604

now added to Carmet's crater-resistant 600 series

Here's a new product of Allegheny Ludlum research to help you meet today's demand for high speed machining of steel. It's an ultra hard tungsten carbide with unusually high crater resistance, wear life and high strength at high cutting temperatures. CA604 operates in the fast cutting ceramic areas, combines high velocity finishing with light to medium feeds. Field tested for more than a year, CA604 is offered in Indexable Inserts and blanks for mechanical holders.

CARMET OFFERS A CARBIDE GRADE FOR CUTTING ANY STEEL ALLOY

CA 604
Extra hard for high speed, high precision machining.

CA 605
For fine finishing and high velocity cuts of steel.

CA 606
For lighter cuts on all steels and magnetic alloys.

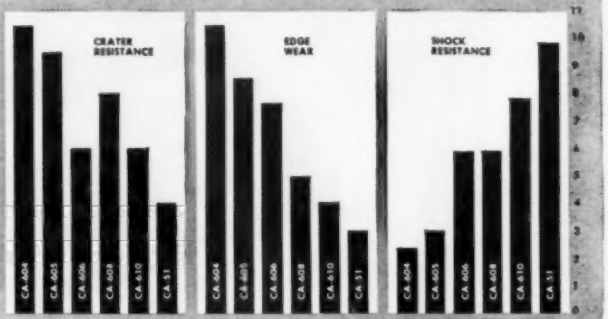
CA 608
For light cuts on all steels, crater resistance.

CA 610
General purpose steel cutting, high shock resistance.

CA 51
For heavy, interrupted cuts, high shock resistance.

Relative Characteristics of Carmet Metal Cutting Grades

This chart shows how grades in the CA-600 Series compare in crater resistance, edge wear resistance and shock resistance. The units of measurement indicate only relationship between grades, not efficiency.



Write for new Catalog C-16

Carmet Cemented Carbides for Industry

This 32-page first edition contains prices and complete specifications on Carmet's full line of cemented carbide tipped tools, Indexable Inserts, blanks and holders. Speed and feed charts, grade comparisons and ordering information included.

ADDRESS DEPT. MB-14.

Your Carmet Distributor carries Carmet standard tools, holders, and Indexable Inserts in stock, assures prompt delivery and will aid you in selecting the proper grades and styles for economical machining. Call him today or write Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Michigan.

WBW 7257

CARMET

CEMENTED CARBIDE DIVISION OF
ALLEGHENY LUDLUM STEEL CORPORATION

AL

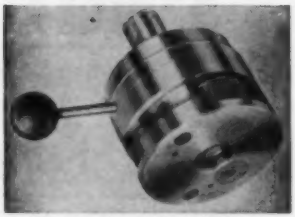
Use postpaid card. Circle No. 330

Thread Rolling Heads

The No. 7 Series stationary head is designed for turret lathes and hand and automatic screw machines, while the No. 7 Series revolving head is for automatic screw machines. Threads can be produced at high speeds without impairing roll life. The self-opening heads feature replaceable helix angle bushings. Sizes 7/16"-⅞" U.N.F. and U.N.C., right hand.

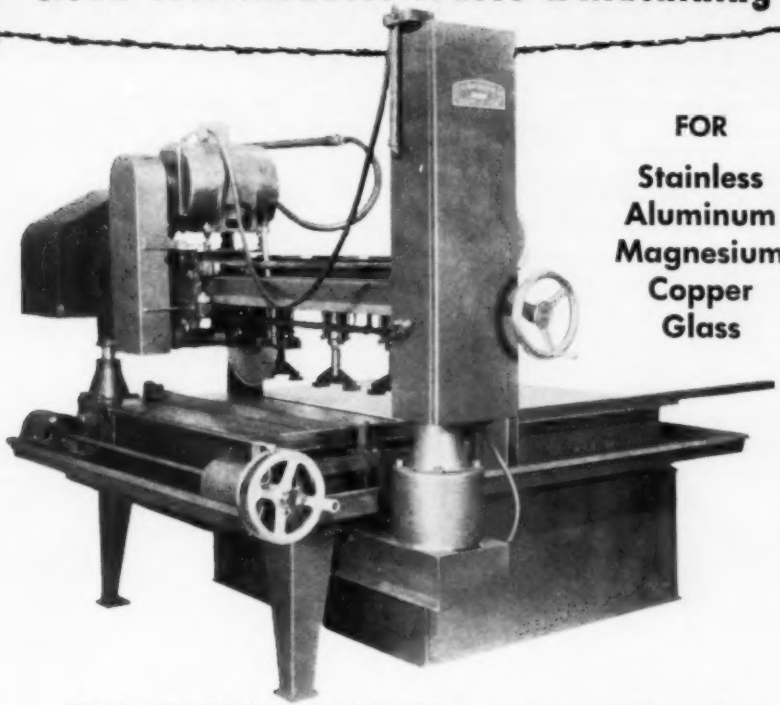
Landis Machine Co., Church and 5th Sts., Waynesboro, Pa.

Use postpaid card. Circle No. 94



Uses replaceable helix angle bushings.

Precision Saw With Air Clamps Makes Clean Cuts..Reduces Waste & Machining



FOR

Stainless
Aluminum
Magnesium
Copper
Glass

Rough edges left from shearing and inaccurate saws pile up needless machining bills . . . plus the cost of wasted metal. With this new Ty-Sa-Man 144-BD Saw, adjustable air clamps hold metal down while the saw travels down the machined transverse rail, delivering cuts with smooth edges to amazing tolerances. Cut parallel strips . . . handle difficult jig fixture work with this self-contained saw which has its own integral cooling system and tank. Among its features are a calibrated guide fence, infinite variable speed from zero to twenty FPM, push-button control and 15 HP motor.

Ty-Sa-Man
SINCE 1885

Write for FREE BROCHURE

TY-SA-MAN Machine Co., Inc.
800 White Ave., Knoxville, Tenn.

Use postpaid card. Circle No. 332

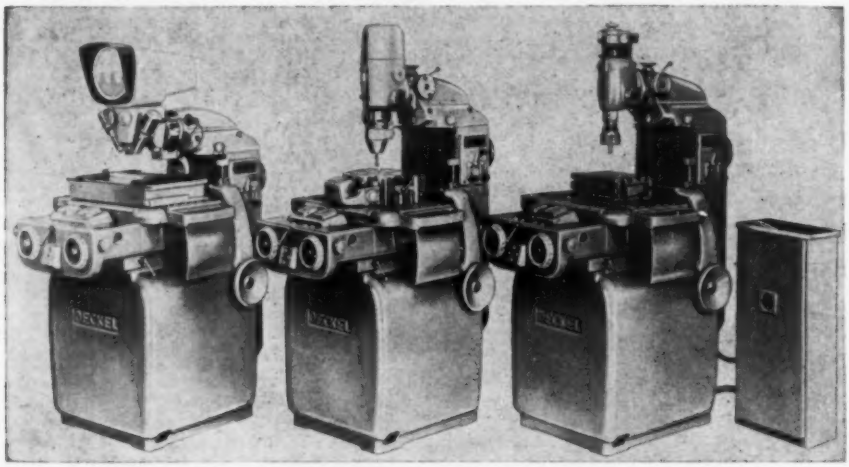
System Offers Interchangeable Heads With Direct Numerical Readings

The Deckel LK Series of interchangeable machine tools is being introduced in the United States by Cosa Corp. The series provides simple interchangeability of jig boring, jig grinding, and optical projection measuring heads on one base; direct numerical readings of settings; and built-in compensation for thermal expansion.

The change from jig boring to jig grinding or optical projection measuring machines takes only minutes. Individual heads are mounted on a rigid bracket supported on a heavy base. Any of the three types can be used as a single-purpose machine, or all three as a universal machine with but one base.

Table measurements can be read directly in numbers to ten-thousandths of an inch (.0001"), the manufacturer reports.

The boring spindle of the jig boring machine has 20 different speeds from



Any one of the machines may be used by itself, or all three as a universal machine with but one base.

40 to 3150 rpm and six different feed rates up or down.

On the jig grinding machine, the grinding spindle has 12 planetary motion speeds from 40 to 500 rpm and infinitely variable grinding speeds from 15,000 to 60,000 rpm. All types of grinding can be performed.

The measuring machine will perform all types of measuring operations. It projects images on a screen 7⅞" in diameter to a magnification of 10 or 20X.

Cosa Corp., 405 Lexington Ave., New York 17, N.Y.

Use postpaid card. Circle No. 95

Dividing Head For Any Width of Table

A three-way adjustment, made up of two slots in the table bracket plus double swivel built into the quadrant, makes possible wide versatility of the universal spiral drive telescopic type dividing head. The unit is adaptable for any milling machine, regardless of width of table or width of coolant well. The dividing head can also be disengaged from bracket or quadrant and used as a plain dividing head.

10" and 12" models are available, right or left hand, with or without direct indexing.

Greaves Machine Tool Co., Div. of J. A. Fay & Egan Co., 2011 Eastern Ave., Cincinnati 2, Ohio.

Use postpaid card. Circle No. 98

Low Carbon Flat Stock For Unhardened and Case Hardened Usage

Low carbon precision ground flat stock, for a wide range of tooling and parts applications, is precision ground to a satin finish of 35 micro inches or better. Stock may be case hardened to 1/32" by submergence in carburizing salt to obtain high tensile strength, yield point and hardness. Costly finishing operations are said to be eliminated by the flawless surface and square corners.

Each piece is individually packaged and identified. Sizes, all 24" long, range from 1/16" to 2⅞" thick and up to 16" wide in 250 combinations of dimensions.

Brown & Sharpe Mfg. Co., Providence 1, R.I.

Use postpaid card. Circle No. 98

Printed Circuit Holder Saves Tooling Costs

An adjustable combination chassis and work positioner, for holding printed circuits during assembly of component parts, has been developed.

The PowRarm, or work-positioner part of the tool, facilitates positioning in any plane of a half sphere, with

instant locking at the desired angle. Attached is Wilton's new printed circuit holder designed for swift loading and unloading of printed circuits.

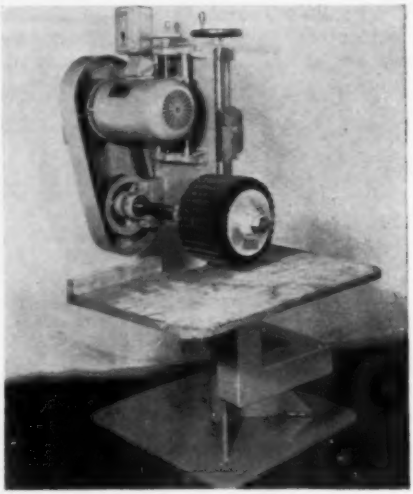
The model shown, Wilton Veep PowRarm No. 344 and printed circuit holder No. 369, or Wilton's larger capacity Junior PowRarm No. 343 with holder, are in the $15.00 to $20.00 price range.

Wilton Tool Mfg. Co., Inc., Schiller Park, Ill.

Use postpaid card. Circle No. 97

Adjustable Stand

The manufacturers of the Vonnegut universally adjustable stand announce a unit equipped with a variable speed drive. Originally used with the Vonnegut brush backed polishing head, the speed drive permits use of buffs, wire brushes, or other types of sanding, cleaning, deburring, or polishing devices. It is designed to perform many applications to save man hours.



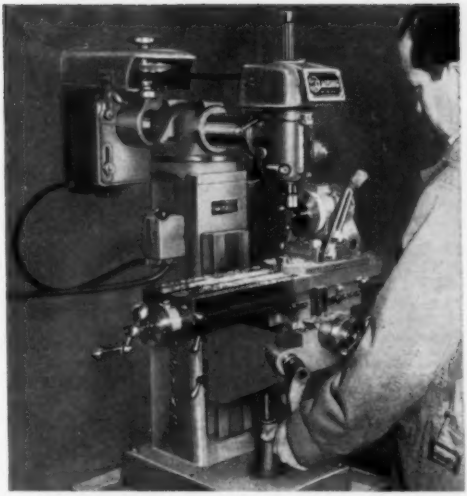
Grinding & Polishing Machy. Corp., 2530 Winthrop Ave., Indianapolis 5, Ind.

Use postpaid card. Circle No. 99

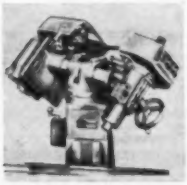
HERE'S PROOF OF PERFORMANCE . . .

"The Clausing Vertical Miller is the best machine for the money on the market today! It is most versatile . . . and extremely accurate".

— F. L. BALLENTINE, EMPIRE TOOL ENGINEERING COMPANY, INC.



The high precision spindle and drive have 7 ball bearings . . . hardened spindle. Ground and hard chrome plated quill has full length bearing in head.



The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to machine at all angles with one set-up.

This report is typical of the experience of users everywhere. The CLAUSING VERTICAL MILLER is a precision machine tool designed for operations where "extremely accurate" machining is required. And, it is an outstanding producer, "most versatile, easiest to set up, get around and operate of *any* miller at or near its low price." Only $850 f.o.b. factory.

VERIFIED ACCURACY— Before it leaves the factory each CLAUSING Mill must pass rigid tolerance tests such as:

1. Top of table perpendicular to column ways within .0005" in 6" travel.
2. T-slots square with cross slide dovetails within .0005".
3. Table, parallel to turret within .001".
4. Spindle square with table, front to rear, within .001" T.I.R. in 5" circle.
5. Spindle taper (internal) run out within .0002" at spindle nose.
6. Table T-slots parallel to table dovetail ways within .0005" in 8" longitudinal travel.

MILLS, DRILLS, BORES, REAMS, SHAPES AT ALL ANGLES . . . WITH ONE WORK SET-UP!

Atlas CLAUSING PRECISION MACHINE TOOLS — ATLAS PRESS COMPANY

Write for Free Literature

CLAUSING DIVISION • ATLAS PRESS COMPANY

2-107 N. PITCHER ST., KALAMAZOO, MICHIGAN

Use postpaid card. Circle No. 342

Master Straight Edge Made of Magnesium

A mammoth straight edge, reported to be the largest manufactured, is made of Dow magnesium tooling plate and handscraped to an accuracy of .0005" over-all. It measures 12'x12"x2½".

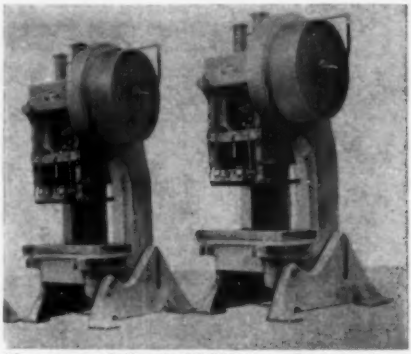
Diamond Gardner Corp., General Packaging Division of Diamond Match Co., Palmer, Mass., needed a large straight edge which could hold close accuracies and yet be movable about the shop. Magnesium was found to be ideal for the job both in weight and in ability to hold accuracies over a long span.

The tool was produced by Monarch Tools, Inc., 2980 Century Blvd., Lynwood, Calif.

Use postpaid card. Circle No. 100

New Line of O.B.I. Presses Features Air Friction Clutch

A complete line of open back inclinable presses features an air friction clutch of a "low inertia" design that results in less wear because of the low number of parts, and weight, to



Size range of line is 25-200 tons. Presses shown here are 150 and 200 ton capacity.

be picked up on clutch engagement. The brake is also air operated and spring set.

The press frames are of welded steel construction, to reduce deflection and vibration to a minimum and secure continued high production of accurately formed parts at standard stroking speeds. The size range of this line of presses is from 25 to 200 tons.

Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill.

Use postpaid card. Circle No. 101

Electric Hammers & Drills Are Now Self-Contained

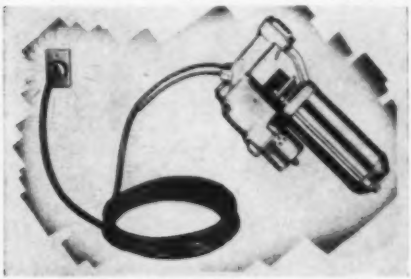
The manufacturer's new 1½" and 2" capacity electric hammers and 2" capacity electric hammer drills are now self-contained. They need no separate control box.

Conversion of alternating current to direct current—formerly performed by a separate controller—is now accomplished by an improved rectifying element inside the tool itself.

The electric hammers produce 3600 blows per minute for fast cutting, chipping and drilling. The electromagnetic hammer drills feature automatic rotation of the drill bit.

Syntron Co., 300 Lexington Ave., Homer City, Pa.

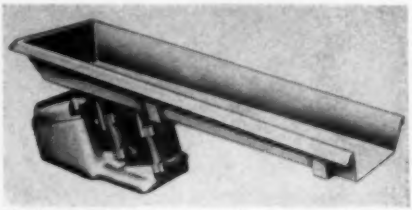
Use postpaid card. Circle No. 102



The cable plugs directly into the power line.

Highspeed, Variable Rate Feeder

The model F-010 Syntron electromagnetic vibratory feeder is said to



Feed rates up to max. cap. of 3 tons per hr.

offer fast, high-capacity, rate-controlled feeding of bulk materials and small parts in weighing, blending, mixing, packaging and similar processing operations.

Adjustment of feed rates from a slow dribble flow to a maximum capacity of three tons per hour is possible. The unit never requires lubrication.

Specially shaped troughs can be supplied to order.

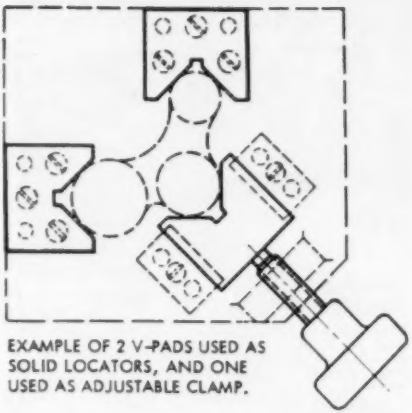
Syntron Co., 300 Lexington Ave., Homer City, Pa.

Use postpaid card. Circle No. 103

Locating, Clamping Pads

V-pads that can be used for locating or clamping have been added to Northwestern's line. They are now available in widths of 1", 2" and 3", with a selection of three thicknesses.

The pads are made of mild steel, not heat treated, so that they may be drilled, tapped or counterbored for use as a solid locator; also used as a clamping device.



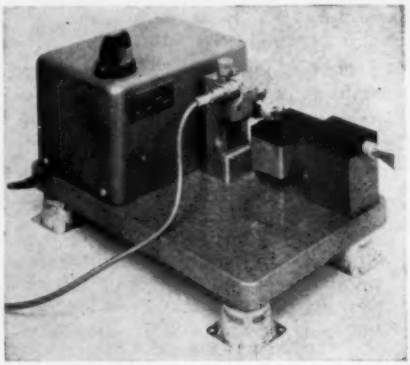
EXAMPLE OF 2 V-PADS USED AS SOLID LOCATORS, AND ONE USED AS ADJUSTABLE CLAMP.

Northwestern Tools, Inc., 118 Hollier Ave., Dayton 3, Ohio.

Use postpaid card. Circle No. 104

Ball Pilotor Measures Surface Roughness

The portable RJ ball pilotor is said to provide for accurate measurement of surface roughness on all types of balls from 1/16" to 1½" in diameter, using only eight separate ball adapters.



Measures balls from 1/16" to 1½" dia.

Hoppers for fast production checking are available for use with the pilotor if required. A variable speed drive has been installed to provide a correct surface speed required for accurate measurement of varying diameter balls.

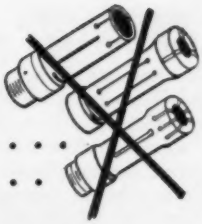
Each pilotor comes equipped with a specially designed bracket for holding a standard MA Tracer. Standard Profilometer Amplimeters of types QA or QC are suitable for use with the pilotor and tracer.

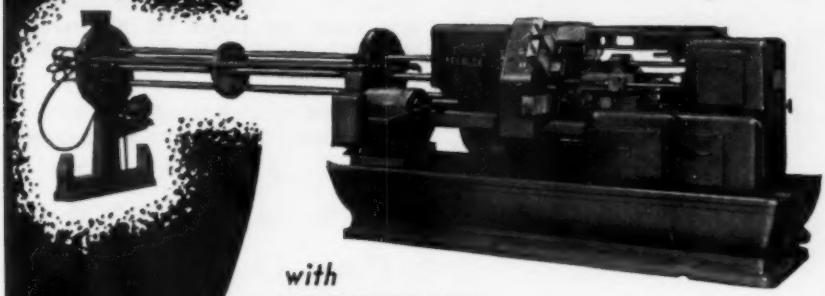
Micrometrical Manufacturing Co., 345 South Main St., Ann Arbor, Mich.

Use postpaid card. Circle No. 105

ELIMINATE

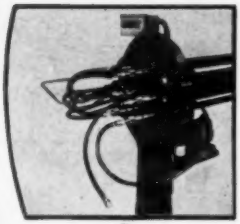
STOCK PUSHERS . . . . . .
FEEDOUT CAMS . . . . . .





with
GREENLEE
AIR-FEED AUTOMATICS

You don't need costly stock pushers and feedout cams with Greenlee Air-Feed Automatics. Air lines are connected to the tubes by quick couplings. Vacuum pumps withdraw pistons for fast restocking. Ask your Greenlee Representative to show you other ways of beating high production costs with Greenlee Air-Feed Automatics.



FAST SET-UPS BECAUSE . . .

- ✓ Wide-open tooling area
- ✓ Interchangeable tool holders
- ✓ Easy-to-change stationary type collets

WRITE FOR CATALOG A-405

PRODUCTION MACHINERY
GREENLEE

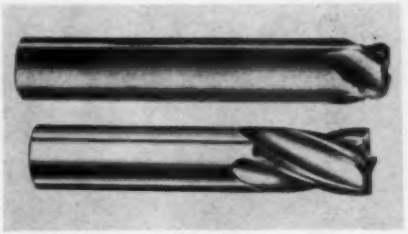
GREENLEE BROS. & CO.
1748 MASON AVENUE
ROCKFORD, ILL.

Use postpaid card. Circle No. 356

Reconditioning of Solid Carbide Tools

The Raymac division of Dexco Corp., Detroit, has announced its greatly enlarged services for custom reconditioning solid carbide tools. As tools are received, the specifications are recorded and immediately they go into the grinding department. Ordinarily the tools are processed and shipped within 7 to 10 days after receipt at the plant. In extreme cases of emergency, Dexco makes delivery same day tools are received.

In addition to reconditioning tools of their own make, Raymac is also equipped to regrind other tools to customer prints. Often customers request



Badly broken and chipped end mill was reconditioned by regrinding with only minimum shortening of shank.

They're tough, they're versatile

Universal Square Has

their tools be converted with Raymac developed cutting edges.

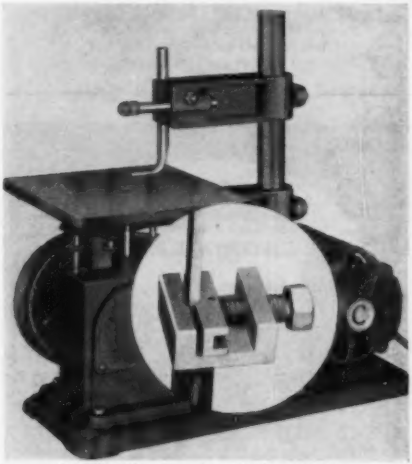
Enlarging on this program of reconditioning solid carbide tools, the company is prepared to offer a complete service in salvage of broken or badly chipped tools. Using the remaining stock, tools of smaller size are made to prints or by brazing on additional material, tools of the same size can be reground to specifications.

Dexco Corp., 15490 Dale Ave., Detroit.

Use postpaid card. Circle No. 108

Chuck On Die Filers Gives Max. File Support

Easier changing of files on Keller die filers is accomplished with a new file chuck. A floating jaw, tightened by a single screw, automatically accommodates itself to any shape of shank. A recess in the chuck post provides extra support for the file shank. The chuck is said to allow faster file changing with less adjusting, plus faster filing because of the maximum file support provided.



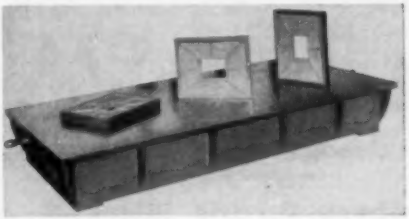
Speedy file changing, little adjusting.

Sales Service Machine Tool Co., 2363 University Ave., St. Paul 14, Minn.

Use postpaid card. Circle No. 109

Universal Square Has Tolerance of .0001"

The square shown features the versatility of both a square and a parallel. Designed of meehanite for long lasting



accuracy, the Busch universal square has all edges and sides hand scraped to a tolerance of .0001" in squareness and parallelism.

J. C. Busch Co., 165 So. Barclay St. Milwaukee 4, Wis.

Use postpaid card. Circle No. 110

Coolant Generator

New two gallon Mistic Mist generator, Model 2RH, has an exterior sight

Model 2RH two gallon Mistic Mist generator.

glass for visual coolant level indication. Cleaning and refilling is accomplished without disconnecting shop air line.

The compact stainless steel nozzle (3/16" diameter) is secured to a plastic covered 60# magnet. Friction-type universal joints will not tighten or loosen once they are set. This permits easy nozzle re-positioning.

Aetna Mfg. Co., 188 S. York Rd., Bensenville, Ill.

Use postpaid card. Circle No. 141

Small-Size Comparator

Comparator head, Model No. AE-22, has been designed for use with the Porta-Check, a portable transistorized

Comparator head and portable comparator.

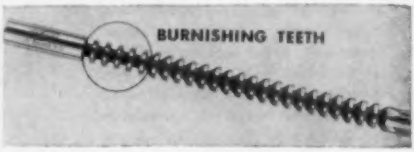
comparator. This head reportedly has a measuring range of .006" on the thousandths scale and .0006" on the tenths scale. When used with the portable unit, the small-but-rugged comparator is said to read to .00001". Both units are readily connected to each other.

B. C. Ames Co., Waltham, Mass.

Use postpaid card. Circle No. 142

Burnishing Teeth On Round Broaches

Standard stock round broaches, manufactured by the duMont Corp., now are all provided with burnishing teeth which produce a glassy finish to precision tolerances.



Used in an arbor of hydraulic press, these push-type Minute Man broaches finish to exact size in one pass. They are available in 13 sizes (for ¼" to 1" round holes) from local industrial distributors' stocks, and promise greater speed and economy in making round holes that must be held to close tolerances and must be perfectly straight all the way through.

The duMont Corp., Greenfield, Mass.

Use postpaid card. Circle No. 111

Single Spindle Fully Automatic Tracing Lathe

The rugged Model 30 tracer lathe, combined with a choice of machine components, meets a wide range of specific turning requirements. It can accommodate one of two tracing units—one performs a single tracing cut in a fully automatic cycle, while the other provides two fully automatic tracing cuts with an indexing tool holder.

One of two headstocks may be selected—one permits shifts between two speeds, while the other allows automatic shifting between four selected speeds.

A choice of rear slides for facing, forming and

Two headstocks available—one permits shifts between two speeds, the other four speeds.

OLIVER Hydraulic Cut-Off Saw cuts nonferrous tubes, bars, extrusions fast!

Nationally known metalworkers find this hydraulic production machine soon pays for itself. A light touch on the large start button moves the saw in a straight line by hydraulic piston. A 14-inch saw cuts 3x6 inches—up to 25 strokes a minute; an 18-inch saw cuts 5x6 inches—up to 20 strokes a minute. Heavy table has micrometer stop to gauge cuts from 1/16" to 20½" long. Air clamp holds work on both sides of saw. Cuts thousands of pieces without variation. Write for Bulletin No. 94-DHM.

Cuts thousands of pieces without variation and without burr

Send for this folder on newest Metal Working Machines

OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

Use postpaid card. Circle No. 373

turning are accommodated.

General specifications are 23" diameter swing over rails; 13½ diameter swing over tracer slide. Diameter of work can range from ½" minimum to 8" maximum. Maximum length of work between centers can be 24", 48" or 72".

Jones & Lamson Machine Co., Springfield 16, Vt.

Use postpaid card. Circle No. 112

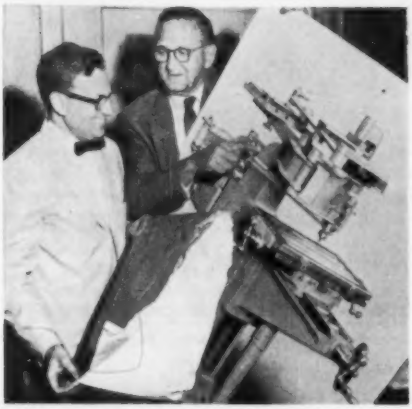
Engraving Machine With Sensitive Controls

J&B Model 2E is a heavy duty engraving machine with sensitive controls. Used in general engraving, die mold, or stamp cutting, profiling and drilling on curved or flat surfaces, this machine makes it easy for the operator to get more work done accurately and faster, the manufacturer claims.

Specifications include: Longitudinal feed of work table, 10"; cross feed of work table, 8¾"; vertical feed of work table, 11¼"; size of work table, 8"x19"; spindle speeds (approx.) 6 speeds, 4500-18,000 rpm; motor, ¼ hp, 1725 rpm.

Johnson & Bassett, Inc., 114 Foster St., Worcester, Mass.

Use postpaid card. Circle No. 113



Shown checking the pantograph engraving machine are Jefferson E. Williams, President of Johnson & Bassett, and newly elected Vice-Pres. in charge of sales and engineering, Iver G. Freeman.

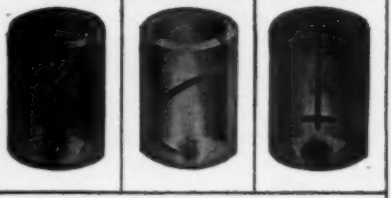
Fischer

Write for Catalog.

Send parts for free grooving and production estimate

ESTABLISHED 1900

FISCHER MACHINE CO.
ELEVENTH & WOOD STS. • PHILADELPHIA 7, PA.



. . . OIL GROOVERS

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc. This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

Use postpaid card. Circle No. 375

FOR **ACCURACIES** TO
.000020"
(TWENTY MILLIONTHS)
. . . *specify* . . .
VEE-ARC
SUPER-PRECISION
LIVE CENTERS

Designed for ULTRA-PRECISION TURNING and GRINDING OPERATIONS!

SUPERIOR FEATURES:

- Extended spindle—carbide tipped!
- Life-time-lubricated, pre-loaded ABEC-7 ball bearings!
- Spring compensation to .020" axial growth without impairing accuracy!

Available at Monarch and Cincinnati distributors or direct at $88.00 f.o.b. shipping point.

Mail Coupon Now!

VEE-ARC CORPORATION, Department BB-2, Westboro, Mass., U. S. A.

Please send Bulletin 1282 on Vee-Arc Live Centers to:

Name _____ Firm _____

Address _____ City _____ State _____

Use postpaid card. Circle No. 376

Punches Eliminate Stripping After Die Cutting

Bernal's self-stripping irregular shapes and thin line punches are said to eliminate wavy lines or ragged edges, and are designed to satisfy critical tolerances of the automotive and aircraft industries.

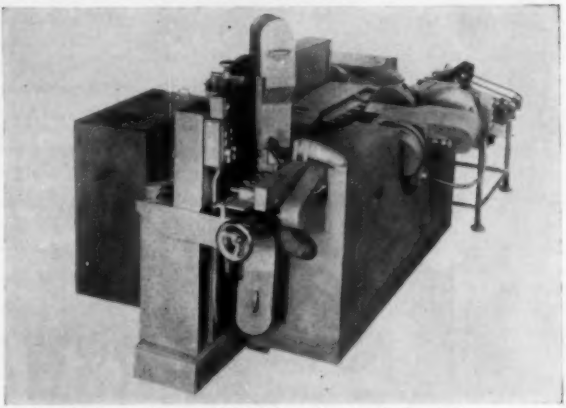
The self-stripping standard round punches are available in sizes from 1/16" to 1½" in diameter, and 15/16" or 1⅛" in height. The self-stripping special or standard punches are used for die cutting materials such as chip board, carton board, display material, asbestos, all types of gaskets, to name a few.

Bernal Tool & Machine Co., 18622 Mt. Elliott Ave., Detroit 34, Mich.

Use postpaid card. Circle No. 114

Compact Dust Collector Used With Grinder Handles 1400 Cu. Ft. of Air Per Minute

The Dustkop Model 1150 is particularly suited to multiple operations where dust volume is high and shop space is at a premium. Using the cyclone principle of separation, the compact unit handles 1400 cu. ft. of air per minute with a 1½ hp motor, the manufacturer reports. A special fiberglass filter is said to remove all particles down to and including 0.5 micron size. No dust settles into working parts.



Dust collector is located behind the abrasive belt grinder.

The straight line grinding and deburring machine shown is used for the grinding and finishing of typewriter tab and margin racks, performing operations that formerly involved six different machines. It is reported responsible for an annual saving of 8000 man-hours. Part of the credit for this saving goes to the air-recirculating dust collector.

There are 37 standard models of the dust collectors, ranging in capacity from 300 to 10,050 cfm.

Aget Manufacturing Co., Adrian, Mich.

Use postpaid card. Circle No. 115

Packaged Boilers Introduced

A line of natural circulation packaged boilers, featuring the first units of their kind capable of generating steam at capacities up to 100,000 lb. or more per hour, has been placed on the market by the Babcock & Wilcox Co., 161 E. 42nd St., New York City.

Company officials said that the new units, which are known as "B&W Package Boilers, Series 100-OG," are expected to cost purchasers a total of approximately 20 per cent less than units of similar capacities which must be erected in the field. No recirculating

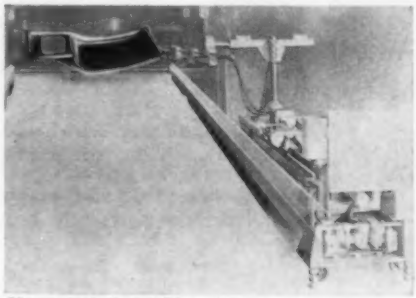
pumps are required, simplifying operating and maintenance problems. Overall maintenance costs also are minimized because practically the entire furnace and boiler envelope is water cooled.

Designed to operate at steam pressures ranging from 250 to 775 pounds per square inch, the units have a wide furnace that allows adequate burner clearance, contributing to complete combustion throughout the range of capacities. Boilers are completely factory-assembled for economical installation. Either oil or gas may be burned, or a combination of the two fuels.

Use postpaid card. Circle No. 140

Portable Extractor

The floor-mounted portable Press-Hand extractor can be used to lead, transfer or remove piece parts, scrap, and other materials on any type of production machine, such as punch presses, forging presses, and die casting machines, with the use of a standard jaw.



Floor-mounted portable extractor.

With a shovel unloader the extractor can be used to strip parts from the top half of a die using a positive knock-out at the top of the press stroke.

The extractors are made in a wide range of standard sizes and can be adapted to suit any specific application.

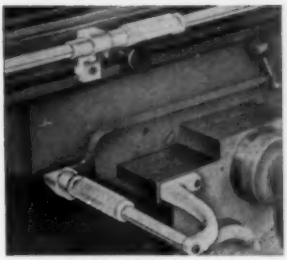
Die & Automation, Inc., 5353 Dixie Highway, Hamilton, Ohio.

Use postpaid card. Circle No. 116

Self-Guiding Vernier Scales

Self-guiding Evertrue vernier scales, easily mounted on any precision machine tool, can be easily, accurately read. Flat scales eliminate parallax and distortion. Direct reading vernier scales reportedly eliminate problems due to backlash, lead screw wear and miscount of turns. Scale and vernier can be rotated within its bracket. Edgcomb Engineering & Engraving Co., Dept. BB, 1105 N. Hollywood Way, Burbank, Calif.

Use postpaid card. Circle No. 117



Scale, vernier rotate in bracket.

Tungsten Carbide Sprayed For Hard Facing

Metco tungsten carbide ThermoSpray powder, for use with the Metco Thermo-Spray gun, is said to permit hard facing with sprayed tungsten carbide at very high deposit efficiency and extremely high concentration of the carbide. Coating speeds are reported as 110 to 150

Metco ThermoSpray powder applied with Metco ThermoSpray gun.

square feet per hour, .001" thick. Any required coating thickness may be applied.

The process is designed for application on parts subject to extreme wear conditions, such as buffing fixtures, sanding templates, and polishing masks.

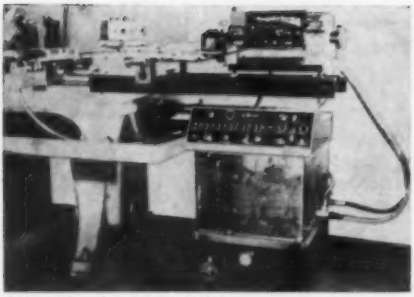
Metallizing Engineering Co., Inc., 1101 Prospect Ave., Westbury, Long Island, N.Y.

Use postpaid card. Circle No. 118

Improved Automation for Turret Lathes

The keynote of the new Acme Hydrive is simplicity of design and rugged dependability. The compact unit presents the latest developments in trouble-free automation for turret lathes.

A sound film is available showing the advantages and operation of the



Automation for turret lathes.

Hydrive and accompanying cross slide actuator.

Acme Industrial Co., 200-222 N. Laflin St., Chicago 7, Ill.

Use postpaid card. Circle No. 119

Air Hydraulic Cylinder Has One-Piece Trunnion

A new line of adjustable trunnion mounted heavy-duty air and hydraulic cylinders features positive adjustment and a solid, one-piece trunnion which

Air and hydraulic cylinder.

is supported and positioned by four threaded cylinder tie-rods.

According to the manufacturer, this design facilitates adjustment, since the trunnion is shifted by loosening the tie-rod self-locking nuts just enough to permit rotation of the rods by their solid hex ends. This rotation provides precise movement of the trunnion to the exact location desired.

Nine available bore sizes range from 1½ to 8 in., with strokes to customers'

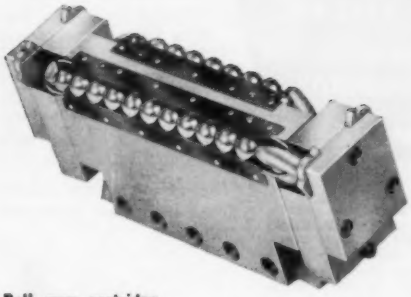
specifications. All models are offered noncushioned, cushioned blind end, cushioned rod end or cushioned both ends; in five mounting styles, flange (blind end), flange (rod end), clevis, foot and adjustable trunnion. Cushion check and cushion adjustment are interchangeable. Mounting dimensions of cushioned and non-cushioned cylinders are identical.

The S-P Manufacturing Corporation, 30201 Aurora Road, Solon, Ohio.

Use postpaid card. Circle No. 120

Ball Way Cartridges

Recirculating ball way cartridges are the latest innovation in a growing group of Beaver devices to further increase the positioning accuracy of machine tool tables, slides and heads. The cartridges, integrated in a moving machine element, are a linear counterpart to a pair of opposed angular contact bearings. Each cartridge consists of two independent self-containing recirculating ball circuits. Four or more cartridges



Ball way cartridge.

are used to give support to the moving member. By the use of shims for adjustment any desired preload is obtained.

The ball way cartridge thus provides extreme ease of motion in one plane and optimum stiffness in the other two planes.

The need for gibs, keepers, and side rail guides is eliminated.

Cartridges are available, to custom design, in load capacities from 1,000 lb. to 6,000 lb. per unit. Smaller and larger units are being engineered and designed.

Beaver Precision Products, Inc., 651 N. Rochester Rd., Clawson, Mich.

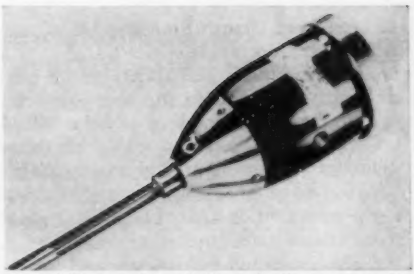
Use postpaid card. Circle No. 122

"As you all know we are being accused of mismanagement. . . ."

Fluid Transfer Gland

The DuCas fluid transfer gland is equipped with high speed aircraft type Class 4 ball bearings and magnetic seals which permit operations in the high rpm and psi ranges. They are claimed to operate at zero leakage even when run at speeds up to 15,000 rpm and pressures up to 1500 psi.

On the flange attached model, illustrated, the housing, containing all of the sealing and operating components, may



Gun drill carrying shaft and flange may be permanently attached to the machine.

be removed from the one-piece gun drill carrying shaft and flange. This enables the shaft and flange to be permanently attached to the machine after a true indicator reading is established.

Changes of bearings, seals or other necessary maintenance or repairs to the housing may be made without curtailing production or disturbing the original installation true indicator reading. A standby housing can be slipped on to the flanged shaft; tapered ground surfaces in the locking nose guarantee interchangeability and alignment.

The DuCas Corp. 1117 Douglas Ave., Providence, R.I.

Use postpaid card. Circle No. 123

Water Soluble Cutting Fluid Does Job of Oil

Cimcool Cimperial concentrate is a water miscible cutting fluid designed to perform heavy duty, low clearance,

low speed operations previously limited to cutting oils.

The extreme pressure additives in the fluid reportedly reduce the heat of metal cutting and permit faster feeds and speeds. The fluid will not turn rancid, and prevents bacterial growth in machine tool reservoirs. It also prevents rusting and corrosion.

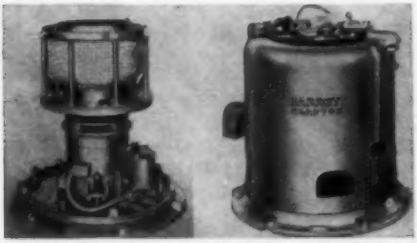
Cincinnati Milling Products Div., The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Use postpaid card. Circle No. 124

Reversible Motor In Centrifugal Washer-Dryer

A Barrett-built, high torque, reversible motor reportedly enables the Barrett centrifugal washer-dryers to handle up to 425 lb. of bright plated nuts, bolts, screws, and other metal parts.

An indestructible rotor absorbs the shock and smoothly reverses the direction of the load, the manufacturer



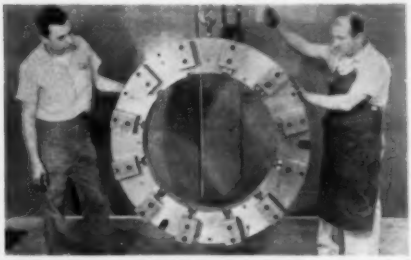
reports. Gyroscopic balancing compensates for any unbalance in loads.

The Leon J. Barrett Co., P.O. Box 378, Worcester, Mass.

Use postpaid card. Circle No. 125

12-Jaw 46" Dia. Chuck

A 12-jaw 46" diameter universal pinch type chuck, for holding large



diameter missile parts, is reported to repeat within .002" t.i.r. at the diameter to which the top jaws have been machined.

The concentric expanding and contracting action of the jaws is used to advantage for rounding out and holding the thin walled sheet metal missile tanks and parts for trimming, facing, turning, and welding operations.

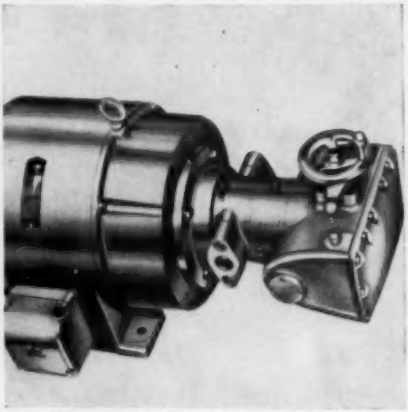
The chuck can be furnished with soft blank top jaws which the user can machine to fit his part, or with special shaped top jaws made to customer specifications.

Horton Chuck Div., United-Greenfield Corp., New Haven, Conn.

Use postpaid card. Circle No. 126

Heavy Duty Frames For Motors Thru 50 HP

Two heavy-duty frame sizes, 364U and 365U, have been added to the Reuland line of spline-coupled hydraulic pump mount motors. The spline cou-



Motors in ratings from ½ hp-50 hp.

pling method provides a direct, pump-to-motor connection. No mechanical couplings are required.

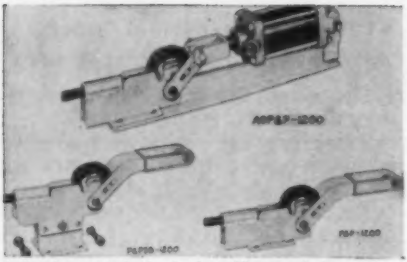
The motors, available in ratings from ½ hp through 50 hp in frame size 182 through 365U, fit all standard make hydraulic pumps.

Reuland Electric Co., Alhambra, Calif.

Use postpaid card. Circle No. 127

Three Push-Pull Clamps Apply to 1200 Lb. Force

Three Knu-Vise push and pull clamps are available in two hand-operated and one air (or oil) operated model for remote control with 85 psi. They are designed to apply up to 1200 lb. clamping force. Built-in deflection provides uniformly tight clamping of parts with normal variation in stock thicknesses. The operating handle is reversible to



2 hand-operated, 1 air (or oil) operated model.

meet operating conditions.

The swivel base model provides 90° total change in clamping direction.

Lapeer Mfg. Co., 1150 W. Baltimore, Detroit 2, Mich.

New Engineering Service

The establishment of a new design engineering service, to be known as AA Industries, has been announced by AA Gage Co., 350 Fair St., Detroit 20, Mich., manufacturers of precision in-

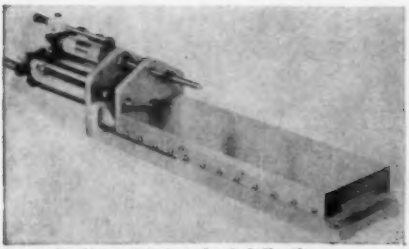
spection equipment, gages, marking machines, special machines and tooling. Three options will be offered to its service: Design only, design and build, or build only—providing a complete single source for any phase of a tooling program. Heading up the new subsidiary is Wesley Grizzel, who has had more than 20 years' experience in the design engineering and manufacturing fields.

Use postpaid card. Circle No. 129

Slide Assembly With Hydraulic Feed Control

An air-powered heavy-duty slide assembly, with built-in hydraulic feed control, includes an air control valve for starting the cycle and two built-in microswitches to permit interlocking slide operation with other machine functions.

The heavy-duty dovetail slide con-



Dovetail slide minimizes load deflection.

struction minimizes deflection when extended under load.

A choice of control arrangements is available. The hydraulic check unit, which may be used to regulate slide speed during any part of the feed stroke, can be furnished in types to check loads of 1200 or 3600 lb. The larger size is also available with precision control. The built-in air control valve, which starts operation of the

slide cycle, may be ordered in any of several types.

Air-powered slides come in a range of three convenient sizes, with working surfaces of 4"x12", 6"x16", and 8"x24"; maximum stroke lengths of 4", 6" and 8"; and maximum feed strokes of 2", 4" and 6", respectively.

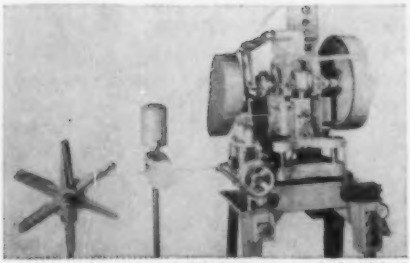
Russell T. Gilman, Inc., 623 Beech St., Grafton, Wis.

Use postpaid card. Circle No. 130

Metal Tag Marking Machine

A press has been developed for producing wrap-around tags from coil stock of aluminum or other soft metals and alloys. The machine marks, punches a hole, and cuts off tags of any length up to 7", using ¾" wide coil stock.

The machine features a back-geared, mechanical press, equipped with an air-



Small stock reel and lubricating stand furnished with the marking press.

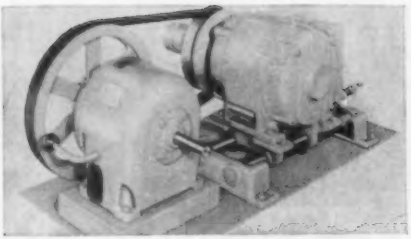
operated clutch and a predetermining counter which can be set up to run off automatically any quantity of tags.

The Noble & Westbrook Manufacturing Co., East Hartford, Conn.

Use postpaid card. Circle No. 131

Variable Speed Drive Uses 4-Speed Transmission

Powered by a standard 1800 rpm Lima electric motor with a self-adjusting variable pitch pulley on the motor



Speed variations from 12 to 1, to 25.7 to 1.

shaft, the Lima Variable Speed Drive is available in ½, ¾, 1, 1½, 2, 3, 5, and 7½ hp ratings.

The drive assembly is manufactured in several different motor and transmission combinations to provide speed variations from 12 to 1 to as high as 25.7 to 1.

The Lima Electric Motor Co., Inc., Dept. 140, Lima, Ohio.

Use postpaid card. Circle No. 132

POT-TYPE SALT BATH FURNACE

The features listed below are but a few of the in-built advantages of the **LUCIFER 2055 SERIES.**

- Eliminates atmospheric problems (oxidation, scaling and decarburization)
- Rapid constant heat
- Choice of 10 models
- Heat ranges to 1,700° F.
- All controls included (automatic indicating controller, selector switch with two thermocouples)
- Quick easy installation
- Low initial cost . . . low upkeep
- Top production performance with unskilled labor
- Minimum replacement down-time

Lucifer Furnaces, Inc., manufactures many standard electric heat treating furnaces and maintains a design department to create special units. For engineering assistance, parts or product information write or call . . .

LUCIFER FURNACES, INC.
Neshaminy 1, Pennsylvania
Diamond 3-0411

BY LUCIFER FURNACES

Use postpaid card. Circle No. 404

HIGHER SPEEDS! FASTER GRINDING!

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.
$60.00
IN U.S.A.

Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

THE SPEED of Kipp Featherweight Air Grinders stays up where it belongs, under load, for efficient grinding even with small wheels. This may not be true with most of the "Plug-In" grinders you now are using.

HAVE YOU GIVEN your toolmakers a chance to save valuable hours by providing them with enough Kipp Featherweight Air Grinders and accessories?

kipp

MADISON-KIPP CORP.

207 Waubesa St., Madison 10, Wis., U.S.A.

Use postpaid card. Circle No. 405

Lathe Tracer Attachment Fits Lathes of 27½" Swing

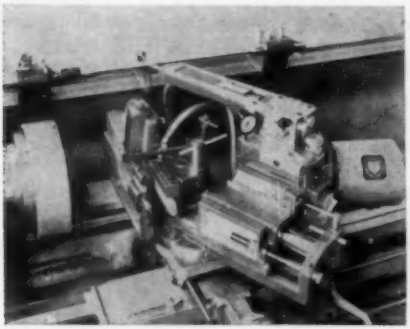
The Leland-Gifford hydraulic lathe tracer attachment converts any lathe for automatic multiple diameter shaft turning and for facing, turning and boring contoured work. The compact, single unit design fits lathes up to 27½" actual swing and up to 30 hp.

The unit is mounted in place of the standard lathe compound slide and may be swiveled to any desired angle, making it adaptable for internal as well as external work.

A micrometer adjustment on the tracer stylus makes it possible to compensate for wear in the diameter of the copy piece or to leave metal for finish grinding.

Feed rate is adjustable from 1" to 35" per minute. Rapid traverse up to 80" per minute can be employed.

Tracer units are available in the following sizes: No. 1 with 4½" stroke and 1400 lb. tool thrust for lathes from



May be swiveled to any desired angle.

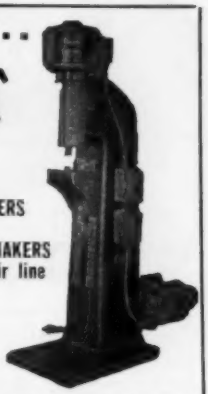
14" to 16" actual swing; No. 2 with 5" stroke and 2000 lb. tool thrust for lathes from 16" to 20" actual swing, and No. 3 with 5½" stroke and 4200 lb. tool thrust for lathes from 20" to 27½" swing.

Leland-Gifford Co., Worcester, Mass.

Use postpaid card. Circle No. 133

RIVETERS..

GRANT



PIONEERS and PACEMAKERS in their line

—head rivets from smallest to ¾" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples

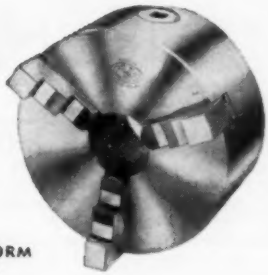
THE GRANT MFG. & MACHINE CO.
CE Station **Bridgeport 5, Conn.**

Use postpaid card. Circle No. 413

ONE OF ENGLAND'S FINEST!

CVA
3 JAW GEARED UNIVERSAL SCROLL
LATHE CHUCKS

WITH AVERAGE GUARANTEED ACCURACY OF .002" THREE INCHES FROM JAW FACE



. . . And these other great features

- ONE PIECE BODY
- FLAME HARDENED JAW WAYS
- INDUCTION HARDENED SCROLL FORM
- COMPLETE WITH 2 SETS OF JAWS AND CHUCK WRENCH

Size	Weight	Dia. of bore	Price*
3½"	6 lbs.	⅝"	$34.00
4½"	6 lbs.	1-⅛"	34.00
5½"	11 lbs.	1-½"	40.00
6½"	16 lbs.	1-11/16"	46.50
7½"	26 lbs.	2-¼"	55.00
9"	38 lbs.	2-¾"	70.00
10½"	68 lbs.	3-½"	86.00
12"	106 lbs.	3-⅞"	115.00

Prices f.o.b. warehouse, N.Y.C.
Back plates available at extra cost.

These are superior chucks produced by an English manufacturer famous for precision built machine tools and represent unbeatable values. A certificate is supplied with every chuck attesting to and guaranteeing its accuracy. All parts are guaranteed for a year against defective workmanship and materials. Repair parts available.

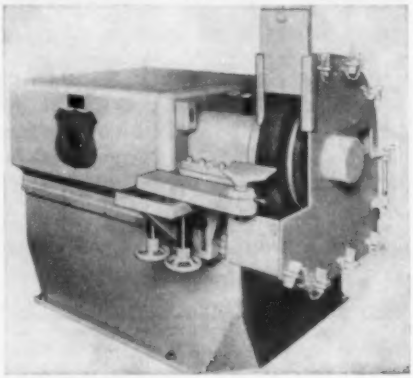
In stock for immediate delivery!

Manhattan Supply Company
151-A Grand Street, New York 13, N. Y.
Telephone CAnal 6-4992

Use postpaid card. Circle No. 414

Hydraulically Driven Snagging Grinder Features Automatic Speed Changer

A hydraulically driven snagging grinder, Model 61HVS, has no gears, belts or adjustable pulley drives. A totally enclosed fan cooled ball bearing motor works a hydraulic pump which moves the fluid contained in the grinder base through the hydraulic motor. This is said to provide constant horsepower, constant peripheral speed and automatic wheel wear adjustment.



Hydraulically driven snagging grinder.

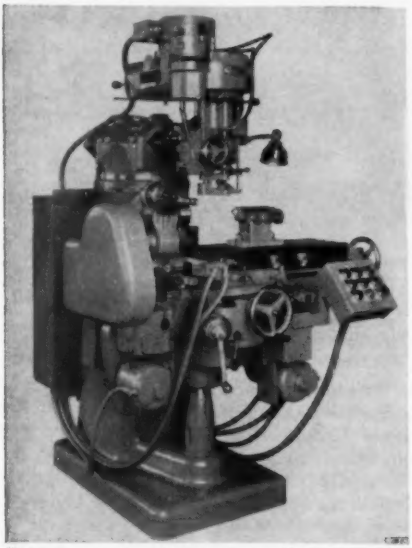
An automatic speed changer maintains constant wheel periphery and compensates for wheel wear, according to the announcement.

The United States Electrical Tool Co., Llewellyn St., Cincinnati 23, Ohio.

Use postpaid card. Circle No. 134

Automatic-Cycle Miller Provides Spiral Milling

This vertical milling machine, designed for spiral or helical milling, uses end mills rather than special milling cutters normally used for spiral milling operations. An advantage of the automatic cycling arrangement is that it is unnecessary to disconnect or remove it to use the machine for regular milling, drilling, or boring operations. The



Unnecessary to disconnect cycling for other operations.

machine is automatic and two options of cycle are supplied; other options on special order.

Standard machine range is a longitudinal travel of 20″ or 26″ dependent on table size; transverse or cross travel, 10″; vertical travel of knee, 18″; vertical travel of spindle, 3″; overarm travel, 13¼″; distance center-line of spindle to column-ways, max. 20½″, min. 7¼″; distance end of spindle to table, max. 18⅝″, min. 0″.

With a standard motor, nine spindle speeds from 80 to 2700 are possible—80, 145, 300, 395, 475, 650, 1020, 1300, 2700. Power feed to spindle is .001″, .003″, .006″ per revolution of the spindle.

The range of leads obtainable is .536″ min., 64.500″ max.

Power feed to the table is longi-

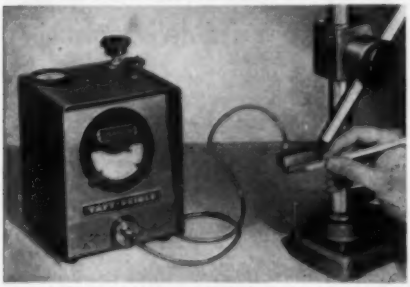
tudinal only. There are eight standard feed changes by means of geared transmission. Feeds are ¾", 1⅛", 1¾", 2⅜", 3⅝", 4¾", 7¼", 9½" per minute. Rapid traverse to the table is at the rate of 56" per minute.

Index Machine Co., Jackson, Mich.

Use postpaid card. Circle No. 135

Air Gaging Capsule

A new line of air gaging capsules has been developed for increasing the scope, improving the accuracy, and reducing the cost of inspection jobs requiring high magnification gaging equipment. The capsule is a small, air-actuated pick-up of the direct contact type. It is used with any Taft-Peirce CompAIRator air gage to provide fast visual readout with quick response. The air capsule is also available in a special long-range model which is designed for



wide tolerance gaging, having a range of .004" to .040".

Capsule comes in both plain and threaded body types and measures only 1½" long x .375" diameter. The plain body capsule, using simple attachments, may easily be clamped on height gages and surface gages for many surface plate or on-machine inspection jobs.

The Taft-Peirce Mfg. Co., Woonsocket, R.I.

Use postpaid card. Circle No. 136

Quick Acting Insert For Clamping

A quick acting insert for clamping can be easily installed on new and old fixtures by drilling and tapping a hole at the desired location. A jam nut or a set screw can be used to lock the insert in position.

Northwestern Tools, Inc., 117 Hollier Ave., Dayton 3, Ohio.

Use postpaid card. Circle No. 137

Anti-Seize Sealant

Led-Plate anti-seize sealing compound No. 250F, with filler added, stops spiral leaks from large diameter threads and coarse fittings. It is also claimed to stop leaks in welded flanges that have become oval or distorted. Especially good for clean-out plugs.

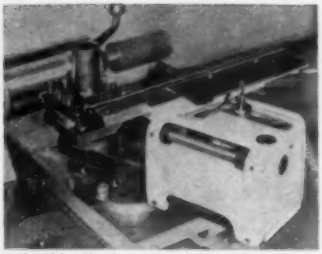
For extremely high temperatures (—350° to +2987°F) and pressures (50,000 psi hydraulic).

Armite Laboratories, Los Angeles, Calif.

Use postpaid card. Circle No. 138

Hydraulic Lathe Attachment Helps Reduce Spoilage

The Profil-Matic hydraulic duplicating attachment is designed to provide accurate semi-automation for small and medium sized lathes. The device replaces the regular compound for precise duplication of parts, hour after hour, with little attention. Spoilage is said to be reduced, provided through the



Unit cuts identical parts, hour after hour, with little attention

elimination of repeated, tedious resettings.

Operation is by hydraulic control of the stylus, which follows the template with a very light pressure.

The attachment places the average shop in a position to bid on long runs of identical precision-machined parts.

G/K Products, 9548 Gidley St., Rosemead 39, Calif.

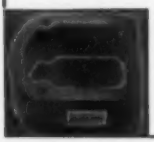
Use postpaid card. Circle No. 170

The MARKET PLACE

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. Rates: $20 per column inch per insertion. Maximum size advertisement accepted in this section is three inches.

Copy should reach us by the first of the month for next month's issue.

Riser Blocks Clausing Mills



1¼" 22.95
2½" 25.95
3½" 29.95

Complete with Bolts .00025 Accuracy

HORTON MACHINE WORKS
868 N. Prior Ave.
St. Paul 4, Minn.

END MILLS SALVAGED

H. S. and Carbide
50% of new price if held to next standard size.
40% of new price if std. size is required.
We make them at least as good as new.

CUTTING TOOLS, INC.
134 Seymour Street
Stratford, Conn.

DRILLS—

Special for jobs no other drills will do, at regular drill prices.

DRILLS—

For mongrel size holes. We stock 486 metric sizes .0118" to 1.500"

DRILLS—

Specially made for your job, if our regular types do not meet requirements.

ELISHA PENNIMAN
ELMWOOD 10, CONN.

.0003 HOLE LOCATION IN ONE MINUTE

Thousands of companies and individuals have proven and accepted our EDGE FINDERS for years. Ask for literature with users list and dealer in your area. Hardened and ground on all surfaces including contours for balance. .500" size $2.50. Deluxe .200" size $10.00. Vise stop for holding same hole location in several pieces $2.95.

Postpaid Except C.O.D. Charges

GLOVER MFG. CO.
423 PARK AVE. MEADVILLE, PA.

End mills--
RADIAL RELIEF SHARPENED

60c per end up to and including ½" diam. 10c each 1-1/8" over 1/2" diam. We also sharpen shell mills, milling cutters and other cutting tools. Prices sent with first order.
Satisfaction guaranteed.
All orders shipped C.O.D. postage paid.

INDUSTRIAL CUTTER SERVICE
9517 Goebel Place Los Angeles 45, Calif.

"We'll skip this department, young fellow."

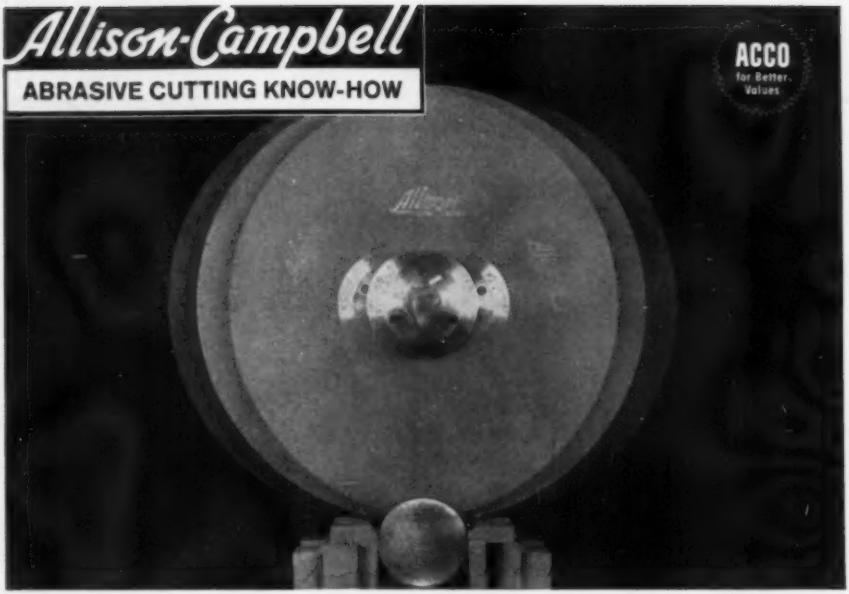
Don't Overlook These Features

MACHINE AND TOOL blue book

Allison-Campbell

ABRASIVE CUTTING KNOW-HOW

ACCO for Better Values



Oscillation Improves Abrasive Cutting 4 Ways

On an oscillating-type abrasive cut-off machine, the cutting wheel is rocked back and forth *across* the cut while the wheel is fed downward. This horizontal movement produces some remarkable results.

1 **Greater cutting capacity** is one big advantage of oscillation. Because oscillation reduces the arc of contact between the wheel and the work, it is possible to cut solid steel bars up to 12" square. Without oscillation, 2" to 3" would be the practicable limit.

2 **Faster cutting** is another benefit of oscillation. Because the reduced arc of contact offers less resistance to the cutting wheel on large sections, the same wheel cuts faster, straighter, and with less feed pressure. Cutting rates of 4 to 8 seconds per square inch are maintained on even the largest cross-sections.

3 **Better quality cuts** are obtained with oscillation. Less heat is generated because of the small arc of contact, and the rocking action permits coolant to enter the cut more easily and prevent any heat build-up.

Burn-free cuts are produced with negligible burr, and there is little or no need for further finishing.

4 **Longer wheel life** is an important economy factor. The lower cutting temperature resulting from oscillation adds extra cuts to the life of every wheel.

The better flow of coolant within the cut washes away metal chips and loose abrasive, helping wheel efficiency.

HOW ALLISON-CAMPBELL CAN HELP

A complete selection of machines and wheels for *any* cut-off application is offered by ALLISON-CAMPBELL. Four types of CAMPBELL machines—chop stroke, oscillating, horizontal, and rotary—in capacities from the smallest stock to 14" rounds . . . billets up to 12" square . . . plate up to 6" thick and 20 ft. long. ALLISON wheels—more than 150 different specifications—rubber or resinoid bond—3" to 34" diameters—.006" to 3/16" thick.

Expert recommendations from your ALLISON-CAMPBELL Field Engineer can solve your cut-off problems for you. He'll be glad to show you how to get the faster, cleaner cuts you can expect from modern abrasive cutting techniques. Ask him.

WRITE FOR NEW BULLETIN

• Individual analysis of your cutting problems can be made in the new ALLISON-CAMPBELL Demonstration Laboratory. Write for a copy of DH-20, a new bulletin which describes how you can use these facilities. Complete details on ALLISON wheels and CAMPBELL machines are also available.

ALLISON-CAMPBELL DIVISION
AMERICAN CHAIN & CABLE

937 Connecticut Avenue, Bridgeport 2, Conn.

ACCO

Use postpaid card. Circle No. 441

Mechanics Through The Ages

THE ANCIENT **RECORDS** KEPT BY THE PARISH CHURCH AT SHEFFIELD, ENGLAND SHOW THAT OVER HALF THE MEN MARRIED THERE BETWEEN 1550 AND 1600 WERE CUTLERS OR SMITHS!

AL REET

Common to England IN THE 1890'S WERE TRAVELING SMITHS WHO, FORCED OUT OF BUSINESS BY THE RISE OF FACTORY TOOL MANUFACTURE, WANDERED FROM VILLAGE TO VILLAGE HANDLING SUCH JOBS AS TURNING OLD RASPS INTO BLACKSMITH'S PINCHERS, FIXING SCREW DIES, AND "DOING UP" VICE JAWS..

This 24-ft. boring mill is facing a disc of 300 stainless . . . a difficult machining operation . . . but this 3-man team quickly found the answer.

This 3-Man Team makes expensive machines pay off

Every time some new alloy must be machined, new problems arise as to the best tool, grade of carbide, feeds, speeds and depth of cut to use. Modern mills and machines are too costly to permit a lot of experimenting with resultant downtime.

The only sure and economical way is by pooling the know-how of a 3-man "tooling team." The Tool Engineer knows the job requirements; the Machine Operator contributes his machining skill; and your Kennametal Carbide Engineer provides information on the latest developments in carbide tooling.

Such a 3-man team can best determine the proper tools required for the job . . . then fill those requirements from the extensive line of Kennametal* tooling. Spearheaded by the Kondex* (patented) line of "throw-away" insert tooling with more than 50 standard styles, plus many adaptations for special needs, Kennametal offers a selection that will provide the right tool for every job . . . for every shop, whether large or small.

Call in your Kennametal Carbide Engineer today to help you get the best tooling for every machine and material . . . applying Kennametal and helping to solve tough machining problems is his *full-time* job. Or write KENNAMETAL INC., Latrobe, Pennsylvania.

*Trademark

5779

INDUSTRY AND **KENNAMETAL**

. . . Partners in Progress

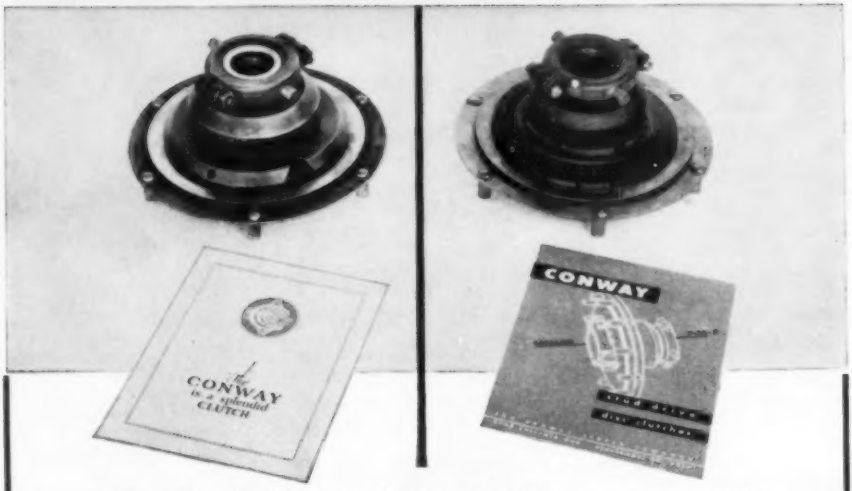
Use postpaid card. Circle No. 442

Products Index

MACHINE AND TOOL blue book

CONWAY CLUTCHES

"The Clutch of Robust Refinement"



• *"A Splendid Clutch in 1928"* • *Infinitely Improved in 1959*

Innumerable veteran Conway Clutches are still doing a productive job because of honest materials and skilled, conscientious craftsmanship.

Standing still is not the Conway way of doing things . . . what is good today must be *better* tomorrow.

For example: the clutch at the left was built in 1928 and has been in operation since *without replacement of a single part.* It still fits into modern plant operation. *The 1959 version, of course, is vastly improved.*

Conway Clutches { for the transmission of power for all industry

• *Write for bulletins and engineering help.*

the CONWAY CLUTCH CO.

1105 Marshall St. • **Cincinnati 25, Ohio**

Use postpaid card. Circle No .443

PRODUCTS INDEX

PRODUCTS INDEX

PRODUCTS INDEX

Index to Advertisers

MACHINE AND TOOL blue book

THE SUNNEN HONING MACHINE

HOLDS PRECISION TOLERANCES ON ALL FOUR HOLE DIMENSIONS

1. **ROUNDNESS**—Produces geometrically-round holes; corrects any out-of-round pattern caused by chucking, heat treating or previous operations—with minimum stock in the workpiece.
2. **STRAIGHTNESS**—Levels all internal irregularities for end-to-end precision. Corrects taper, waviness, bow, hour glass, barrel, bell mouth, etc.
3. **DIAMETER**—Quick, economical precision sizing—with production tolerances down to .0001", or as close as .000025" if needed.
4. **SURFACE FINISH**—Produces consistent finish down to 2 micro-inches in hardened materials—no heat checks or smear metal.

Diameter range .120" to 2⅝". Hones open or blind holes, in almost any material from steel to glass. Average installation cost under $1,000. No jigs or fixtures, no chucking, no set-up time.

WRITE FOR FREE BULLETINS OR ENGINEERING SERVICE

WRITE FOR FREE BULLETIN

SUNNEN PORTABLE HONES

. . . size and finish holes anywhere in any position

The tools of a thousand uses. Invaluable for small lot production . . . for large or heavy parts . . . sizing or correcting undersized, tapered, or out-of-round bores in parts . . . for "on-the-job" hole re-sizing on machine repairs.

Requires no expensive set-up time; eliminates costly down time; maintains alignment. Fast stock removal, smooth surface finish, accuracy within .0005". Diameter range 1¾" to 20½". Powered by portable electric drill. (Can also be used in drill press or radial drill.)

SUNNEN® PRODUCTS COMPANY

EE FIELD ENGINEERING ANYWHERE IN U. S. **HONING**

7922-B MANCHESTER AVE., ST. LOUIS 17, MO.
CANADIAN FACTORY: CHATHAM, ONTARIO

collets, pushers, details

accuracy is our Standard

Allen's Burn Style

TAPER LOCK PUSHERS

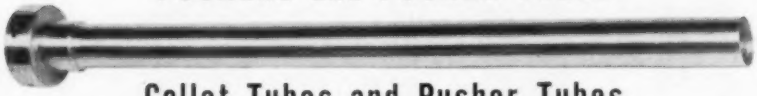
Automatic Adjustment
Positive Feed

Minimum Scratch
When Specified

SPECIAL DETAILS TO PRINT

Let Us Quote Your Details

We Will Duplicate COLLETS, COLLET TUBES, PUSHERS and PUSHER TUBES



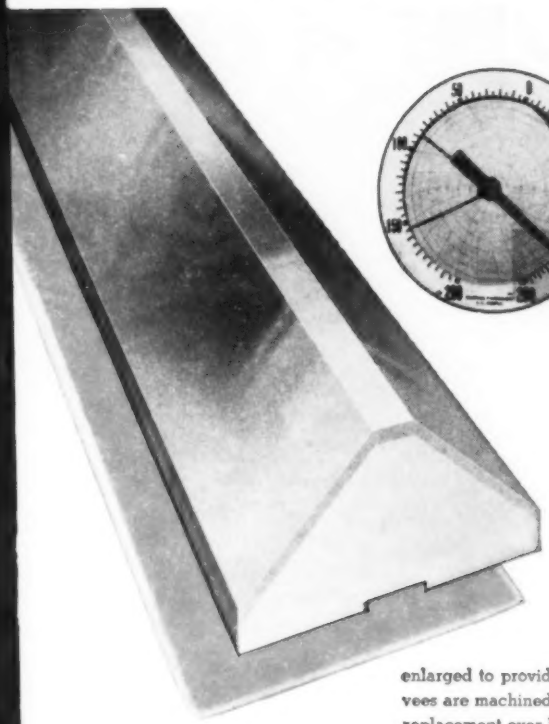
Collet Tubes and Pusher Tubes

ALLEN COLLET MFG. CO., INC.

17720 CLARANN AVE. • MELVINDALE, MICHIGAN

Use postpaid card. Circle No. 449

ANYWHERE IN U. S.



150° BELOW

After hardening to 62 Rockwell C the solid tool steel "AMERICAN" Pacemaker bed vees are stabilized in the deep freeze at 150 degrees below zero.

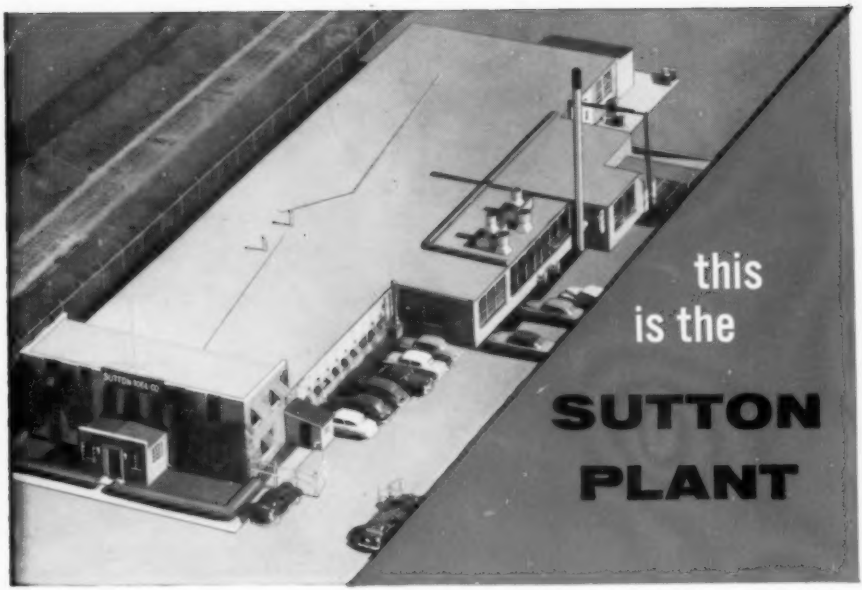
This freezing treatment not only raises the surface hardness but thoroughly stabilizes the metallurgical structure and prevents twisting or warping.

On the new DeLuxe Model "AMERICAN" Pacemaker the bed vees have been enlarged to provide extra large bearing area for the carriage. The vees are machined to gauge tolerances for interchangeability should replacement ever be required.

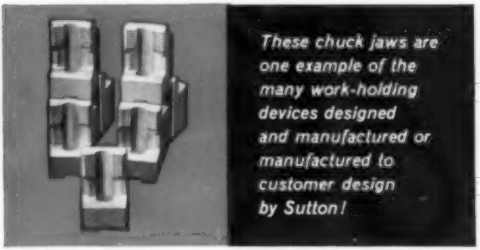
This is but one of the outstanding advantages offered by the new DeLuxe Model Pacemaker. Others are illustrated and described by bulletin No. 124—want one?

THE AMERICAN TOOL WORKS CO. Cincinnati 2, Ohio, U. S. A.

LATHES AND RADIAL DRILLS



Where SPECIAL TOOLS and ALL KINDS OF WORK-HOLDING DEVICES ARE MANUFACTURED!



These chuck jaws are one example of the many work-holding devices designed and manufactured or manufactured to customer design by Sutton!

- Standard and Special Chuck Jaws
- Expanding Mandrels
- Gear Hobbing Arbors
- Special Arbors of All Types
- Special Collets
- Special Collet Chucks (Air and Hydraulically Operated)
- Special Diaphragm Chucks to Customer Designs

• Milling Machine Adapters • Special Adapters for All Machines • Special Boring Bars • Extension Tap Spindles • Special Machine Spindles • Special Screw Machine Spools and Bushings • Special Tool Blocks and Tool Holders • Special Cutter Heads • Special Mill and Drill Sleeves • Many Other Unusual Designed Tools

Check Sutton Ability to Make, Deliver, and Price Such Items as These! Write for Tool Bulletin No. 70

SUTTON TOOL CO., Dept. MTB-2 Phone 1194, Sturgis, Mich.